

Chemistry International

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)



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CHEMISTRY INTERNATIONAL

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)

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Front cover: The Queen's University of Belfast, venue of the 5th International Symposium on Hydrogen in Metals.

No, the Revisions to the *IUPAC Handbook* section does not yet include a new name for 'Editor Chemistry International' to be put on p. 11. However, progress is being made and I *may* be able to slip in some definite news just before this issue actually goes to press. For the time being, therefore, in spite of the fact that we now have a new publisher, briefly introduced on pp. 2–3, the style and content of *CI* will remain essentially the same as before — although you will notice (perhaps) some changes (improvements?). It did not seem to be sensible for me to make any significant modifications when the arrival of my successor is within sight.

After the excitement of the last issue, with its articles on anniversaries, General Assemblies and Bureau meetings, we get down to normal business again with this one but not, I suggest, just dull routine. We have our first report (pp. 7–9) on one of our NAOs — the Asociación Química Argentina, the result, I like to think, of my meeting with Dr J. M. Barnett at Lyngby. Let us hope that this will induce other NAOs to tell us something about themselves. Generation, compilation, critical assessment and dissemination of data are all very much the concern of various IUPAC bodies so I hope you will agree that the short articles on the Imperial College Thermophysical Properties Data Centre (pp. 21–23), closely linked with Commission I.2, and CODATA (pp. 10–16) are relevant. The second one should really have gone in the last issue — it contains a report on the CODATA General Assembly — but could not be fitted in. I apologize to CODATA and particularly Dr Lide and Prof Westrum, both of whom provided material in good time. Of special concern to Commission VI.5 (but also to any of us who eat!) is the FAO Code of Conduct on Pesticides (pp. 26–27). You will recall that Prof Büchel (*CI*, 1984, No. 5, pp. 20–28) laid emphasis on the value of pesticides in increasing the world's food production and the continual reappraisal of their effects on man.

Those of you who read the summary minutes of Committees and Commissions cannot fail to have noted the arguments about the recommended change in standard state pressure. Will the article by Dr Angus (pp. 17–18) finally settle the matter or revive the controversy? I am sure that whoever is Editor of following issues of *CI* will welcome letters on the subject. Note — although I am told that 1985 will see a change in the paper on which *CI* is printed I doubt whether it will be acid-proof.

Finally, I referred earlier to the Revisions to the *IUPAC Handbook* section. This feature of *CI* has been steadily growing, 1½ pages in August, 2½ in October and 4½ in December. This time we start 1985 with 8 pages. I am told that this extraordinary increase is because the boxed appeal on p. 45 of the *Handbook* (to advise the Secretariat of errors and changes in the Alphabetical Index) has largely been ignored until the forms in connection with the 1985 General Assembly had to be returned. Black mark, ladies and gentlemen.

A NEW EDITOR — nearly

Almost as a postscript to my editorial, but deserving its own heading, I am delighted to be able to announce that you will indeed have a new, real, Editor in 1985. On 13 December 1984, the apparently most appropriate applicants for the post of Information Officer/Affiliate Affairs Secretary, were interviewed at the Secretariat and, as a result of these interviews, the post was offered to Dr Michael H. Freemantle. He will start work at the Secretariat on 1 April 1985. Meanwhile, so as to avoid missing any issues of *CI*, you will have to put up with me and the first thing I have in mind for the April issue — by way of introduction and just in time to put on his desk before he arrives — is a short article on Dr Freemantle and his new duties.

R. W. Fennell

Official Publisher to the Union

As announced in *CI* 1984, No. 6, p. 2, the new official IUPAC publisher is Blackwell Scientific Publications (BSP) Ltd. The name Blackwell may be familiar to many of you, as it was to me, as a bookseller but not perhaps as a publisher — particularly as a publisher of scientific books and journals. A few words on BSP would therefore

not be out of turn.

The new 'Blackwell' company was founded in 1939 to publish and sell medical and scientific research books and to form a medical lending library. (The emphasis on medicine was linked to the endowment of a Medical School Trust at Oxford by Sir William Morris, later Lord Nuf-



Blackwell Scientific Publications, from the River Thames (or Isis), Oxford.

field.) The company's first book, *The Essentials of Anaesthesia*, appeared in November 1940 and quickly sold out. Steady progress was made during and immediately after the war, with the continued publication of monographs on pure science and research, but in the early 1950s (at about the same time as the present Chairman and Managing Director, Per Saugman, joined the firm) the company policy was changed and an effort was made to compete with established publishers of textbooks — an effort that has resulted in the bulk of BSP book sales being of undergraduate and postgraduate textbooks. In 1974 the firm published its thousandth textbook,



Journals Production Department



Mr. Per Saugman

and by no means all of these books have been in the medical field.

BSP's first periodical appeared in 1955 — the *British Journal of Haematology*. Today over 100 journals are published, many of them in the medical field but others covering, *inter alia*, astronomy, biology, chemical industry, ecology, entomology, food science, geology, hydrology, microscopy — and now pure and applied chemistry.

All this increasing activity meant that the former premises became inadequate and BSP moved into its present purpose-built building, on the western outskirts of Oxford, in 1972. The Journals Production Department is on the UK second (US third) floor of this building, which should ensure not only that the Editor keeps fit but also that *C/* will achieve a higher standard (especially when the new Editor takes over?).

R. W. Fennell

SUMMARY MINUTES OF COMMITTEE AND COMMISSION MEETINGS

Interdivisional Committee on Nomenclature and Symbols (IDCNS):

Oxford, UK, 10 and 11 September 1984

The Committee reviewed the nomenclature, symbols, and terminology work of the IUPAC Divisions and Committees and of other related international bodies. Noting the widespread and continuing activity in the field of stereochemistry, the IDCNS recommended that a Commission on Stereochemistry be organized within IUPAC. A proposal to provide names describing 'divided by —', e.g. 'lineic' for 'divided by length' is under consideration; the Committee is awaiting further comment

before taking action. The Committee also considered an informal proposal for a name for a unit for quantities having the dimension one; the suggestion of 'one', symbol I, was agreed upon in principle.

Review of the publications process resulted in agreement that proposed documents with handwritten notes would be unacceptable, that the 8-month period for comment would begin with publication of the synopsis in *Chemistry International*, and that copy submitted for final IDCNS approval should be equivalent to that to be submitted in camera-ready form for printing.

Publication was approved for the completed

Stage 1 in the preparation of a *Glossary of IUPAC-approved Terminology*; this stage consists of a list of official IUPAC source documents (CI, 1984, No. 6, pp. 42–46). A listing of about 2500 terms and their source references, Stage 2, is essentially complete. Stage 3 will consist of appending the actual definitions themselves.

Robert B. Fox

Commission II.2 — Nomenclature of Inorganic Chemistry: St Lambert (outside Paris), France, 16–20 July 1984

Membership changes

Dr Thomas D. Coyle's resignation from the Commission was accepted. The nominations of Prof S. Fallab and Dr M. O. Albers as National Representatives of Switzerland and South Africa, respectively, were accepted.

Current programme

The Commission is continuing to give its undivided attention to the revision of Part I of *The Nomenclature of Inorganic Chemistry* (the Red Book), which summarizes the basic aspects of inorganic nomenclature. Treatises on specialized subjects, which will be compiled as Red Book Part II, continue to be developed within working parties for review by the Commission at a later date.

Red Book revision: Part I

At its 1984 meeting the Commission accomplished the final editing, and released for approval by the Inorganic Chemistry Division and IDCNS, the documents: I-1 *Aims, function, and methods of nomenclature*; I-3 *Elements, atoms, and groups of atoms*; I-4 *Formulae*; I-8 *Ions, radicals, and salts*.

New drafts for I-2 *Grammar*, I-6 *Solid state chemistry*, I-7 *Neutral molecular compounds*, I-9 *Oxo acids*, and I-10 *Coordination compounds* were reviewed and are to be edited and ready for submission for final approval in 1985.

Draft documents I-5 *Nonstructural stoichiometric names* and I-11 *Boron compounds* are being prepared in working parties.

T. E. Sloan

Commission IV.1 — Macromolecular Nomenclature: Prague, Czechoslovakia, 5–9 September 1984

The Commission met in Prague to complete its work on several documents. It examined in detail a thoroughly revised fifth draft of a proposed report entitled *Terminology related to crystalline polymers*,

which deals with polymeric systems exhibiting crystallinity in the classical sense. After further extensive changes, the Commission voted unanimously its approval of this important document and decided to forward it to IUPAC for publication.

Another document unanimously approved by the Commission, after further revision, is that entitled *Terminology for polymerizations involving chiral monomers or resulting in optically active polymers*. It deals with polymerizations of mixtures of stereoisomers and diastereoisomers that are individually optically active (chiral) and of polymerizations of prochiral monomers giving optically active polymers. The document introduces several new terms, such as 'stereoasymmetric polymerization'. IUPAC approval is now being sought.

Significant progress was also made on a lengthy draft entitled *Terminology related to individual macromolecules, their assemblies, and dilute polymer solutions*. It is expected that this major document will be completed at our next meeting, during the IUPAC General Assembly in Lyon. The document entitled *Nomenclature of inorganic and coordination polymers*, produced in cooperation with the Commission on Inorganic Nomenclature, is being published as 'Recommendations 1983'. The Commission's recommendations entitled *Source-based nomenclature of copolymers* and *Classification of polymers* are undergoing IUPAC review prior to publication. A note dealing with the terminology for molar masses in polymer science has appeared in several journals. The Commission formally repealed a now-obsolete report entitled *Report on nomenclature in the field of macromolecules* (*J. Polymer Science*, **8**, 257 (1952)). The Commission also discussed a compendium of polymer nomenclature, abbreviations, terminology related to bulk polymers, and several other new projects. It considered its membership in view of the impending completion of the terms of several Titular and Associate Members, and adopted rules for the conduct of its business. Finally, the Commission passed a vote of thanks to its Czech colleagues for their warm hospitality.

Copies of the documents cited above may be obtained from the secretary of the Commission, Dr N. M. Bikales, National Science Foundation, Washington, DC 20550, USA.

N. M. Bikales

Commission V.8 — Solubility Data: London, Ontario, Canada, 18–20 August 1984

The annual meeting of Commission V.8 with 39 attendees consisting of members, contributors, national representatives, and observers, as well as two Pergamon Press representatives, was held at the University of Western Ontario.

A review of the Commission's accomplishments was given by the Chairman, A. S. Kertes, who cited the publication of 18 volumes in the *Solubility Data Series* (SDS) with two others at the publisher. The



Commission on Macromolecular Nomenclature. From left to right: D. Braun, N. Bikales, P. Kratochvíl, A. Jenkins, W. Work, G. Allegra, R. Bareiss, I. Mita, K. Loening, P. Sigwalt, W. Ring, I. Papisov.



Commission IV.1 gets ready to do some real hard work (down an old silver mine). From left to right: I. Papisov, W. Work, N. Bikales, P. Kratochvíl, A. Jenkins, Mrs. Mita, I. Mita, R. Bareiss, J. Horská, W. Ring, G. Allegra, Czech boy.

Commission then turned its attention to other present and future activities. These included such items as future contractual arrangements with a publisher, the automation of solubility data for interactive use, the publication of new guidelines for producing the SDS volumes, need for a journal on solubility phenomena, activities concerning the solubility data and other topics. Perhaps the greatest emphasis during the course of the meeting was given to the issue of a position paper on the assembly of the data into an automated database. Considerable attention was given to database content and format. Representatives from Pergamon were most helpful in achieving the proposed position endorsed by the Commission.

Reports by Subcommittee Chairmen and National Representatives added to the positive conclusion that progress was being achieved in the publication of new volumes for SDS. The Commission adjourned its meeting with a decision to reconvene at the General Assembly in Lyon, France, on 31 August–3 September 1985.

The Commission meeting was followed by the IUPAC-sponsored Symposium on 'Solubility Phenomena' which was attended by 70 scientists, 31 from Canada and the United States and 39 from all other countries. The Symposium featured 7 plenary lectures, 27 contributed papers and 13 poster sessions. A survey of the attendees indicated a strong sentiment for holding future symposia in the same subject area. An interval of 2 to 3 years was suggested as a suitable period between meetings.

L. H. Gevantman

Commission VII.4 — Toxicology. Subcommittee on Toxicology of Selenium: Beijing, China, 30 May 1984

The 1984 Annual Meeting of the IUPAC Subcommittee on Toxicology of Selenium was convened at Fragrant Hill Hotel, Beijing, in connection with the 3rd International Symposium on Selenium in Biology and Medicine. Nine members from seven countries were present.

The Subcommittee reviewed the second interlaboratory trial on the determination of selenium in human serum and urine and endorsed the plan for a third trial on lyophilized human whole blood.

Dr B. Welz presented the results from the experimental study of critical parameters in the hydride generation technique. An interlaboratory survey to evaluate these parameters was considered by the Subcommittee and will be organized in autumn 1984.

The Subcommittee sees the need of speciation studies of selenium in biological systems and the new speciation projects will be considered at future meetings of the Subcommittee.

Y. Thomassen

We congratulate:

Prof V. Gold (Commission III.2) on being appointed the 1984–85 Ingold lecturer by the Royal Society of Chemistry.

Prof M. Grasserbauer (Commission V.2) for being chosen by the Royal Society of Chemistry to give the Theophilus Redwood lecture in March 1985 at the University of St Andrews, UK.

Prof D. J. Waddington (Chairman, CTC) on becoming the Royal Society of Chemistry's 1984–85 Nyholm lecturer.

We regret to record the death of:

Prof V. Deulofeu, Argentina (5 October 1984) — Bureau (1963–69).

Academician N. M. Emanuel, USSR (8 December 1984) — Executive Committee/Bureau (1971–1979), President of National Committee of Soviet Chemists.

Prof A. V. Kiselev, USSR (17 July 1984) — Commission I.6 (1969–1975).

Bailar's First Law of Sociology

I noted (*C&EN*, 24 September 1984, p. 72) that John C. Bailar, Jr, of Urbana, Ill., USA, had the attention of readers drawn to his First Law of Sociology — 'It's easier to get in than it is to get out'. He emphasizes the generality of his law, applying as it does to debt, bad habits, bridge clubs and church work. So far so good, but I wonder, if this is the same J.C. Bailar Jr whom I knew as IUPAC Treasurer in my early days, whether membership of the Union was considered in the formulation of the Law. The 'old days' were, of course, in the era of the so-called 'charmed circle' ('exclusive club') so it wasn't easy to get in. Now, of course, the 12-year rule is on the horizon which will not just make it easy to get out, it will be obligatory! Perhaps IUPAC is 'the exception that proves the rule' or, possibly, the Law does not apply to a corporate body associated with Natural Science.

There is another First Law of Sociology — formulated by one Dibble (whom I do not know) which was referred to in *C&EN*, 3 September 1984, p. 40 — 'Some do, some don't'. I have to admit that this certainly applied to the members of Division V, and probably of other Divisions, in days gone by — but perhaps not now.

R. W. Fennell

Asociación Química Argentina — AQA

Formation

The Argentine Chemical Association was founded by a group of 30 chemists on 29 July 1912, just 15 years after the creation of the first School of Chemistry in the University of Buenos Aires in 1897. Dr Enrique Herrero Ducloux, a distinguished professor whose work contributed greatly to the development of a scientific methodology in the early days of the chemical profession, was the first President of the Association.

In later years, the Biochemistry School and the Chemical Engineering School were started, thus reflecting the gradual expansion of the chemical needs of the medicinal and industrial fields.

Objectives

As established in the original bylaws, the aims of the Association read as follows:

- To foster and maintain the spirit of cooperation amongst people interested in the progress of chemistry and related sciences;
- To promote the advancement of chemical sciences;
- To protect the professional interests of chemists.

Growth over the years

To begin with, AQA rented its headquarters near the School of Chemistry, close to the historical Plaza de Mayo. Only in 1964 did AQA move to its own premises at the present address. A private residence, Sánchez de Bustamante 1749, was converted to fulfil the requirements of the Association.

Total membership has increased from those 30 founders to some 3000 members at the present time, registered in the following categories:

- Active members:* Graduates in chemistry and chemical engineering;
- Affiliate members:* Students, trade school technicians, and members of other professions;
- Sponsoring members:* Chemical companies providing financial assistance.

Just one year after its creation, AQA launched the first issue of *ANALES*, a journal that publishes original papers on chemical research performed by scientists and university pro-



Sánchez de Bustamante 1749, Buenos Aires.

fessors, which has developed into one of the leading chemical journals in Latin America. Later, in 1935, in line with the growth of the chemical industry in the country, the publication of *INDUSTRIA y QUIMICA*, a periodical journal covering technological information, was started.

The library, the development of which has been one of the main priorities of the Association, has gathered one of the largest compilations of chemical books in the country. International journals are received by subscription and exchange with other chemical societies. The complete collection of the Chemical Abstracts, from its first issue in 1907, is kept up to date.

Chemical meetings

The Association organized the first National Chemical Congress in Buenos Aires in 1919; ever since then regular meetings have been held in different cities, Cordoba being host to the last one in 1982.

The AQA fostered the organization of South American Chemical Congresses, the first of which took place in La Plata, Argentina, in 1924. Others followed until the creation of FLAQ — Federación Latinoamericana de Asociaciones Químicas — in 1959. Since then the FLAQ Secretariat, with headquarters in Lima, Peru, has been entrusted with the responsibility of organizing the Latin American meetings. The XVIth L.A. Chemical Congress was held in Rio de

Awards

Prizes of national recognition are awarded annually by AQA to distinguished chemists who have excelled in academic fields. There are also awards granted to outstanding graduates from chemical schools. It is worth mentioning the important influence exerted by Dr Luis F. Leloir (1970 Nobel Prize for Chemistry) on young chemists oriented towards research in biochemistry. Dr Leloir started his scientific work under Dr B. Houssay (1947 Nobel Prize for Physiology, shared with C. and G. Cori).

Present organization

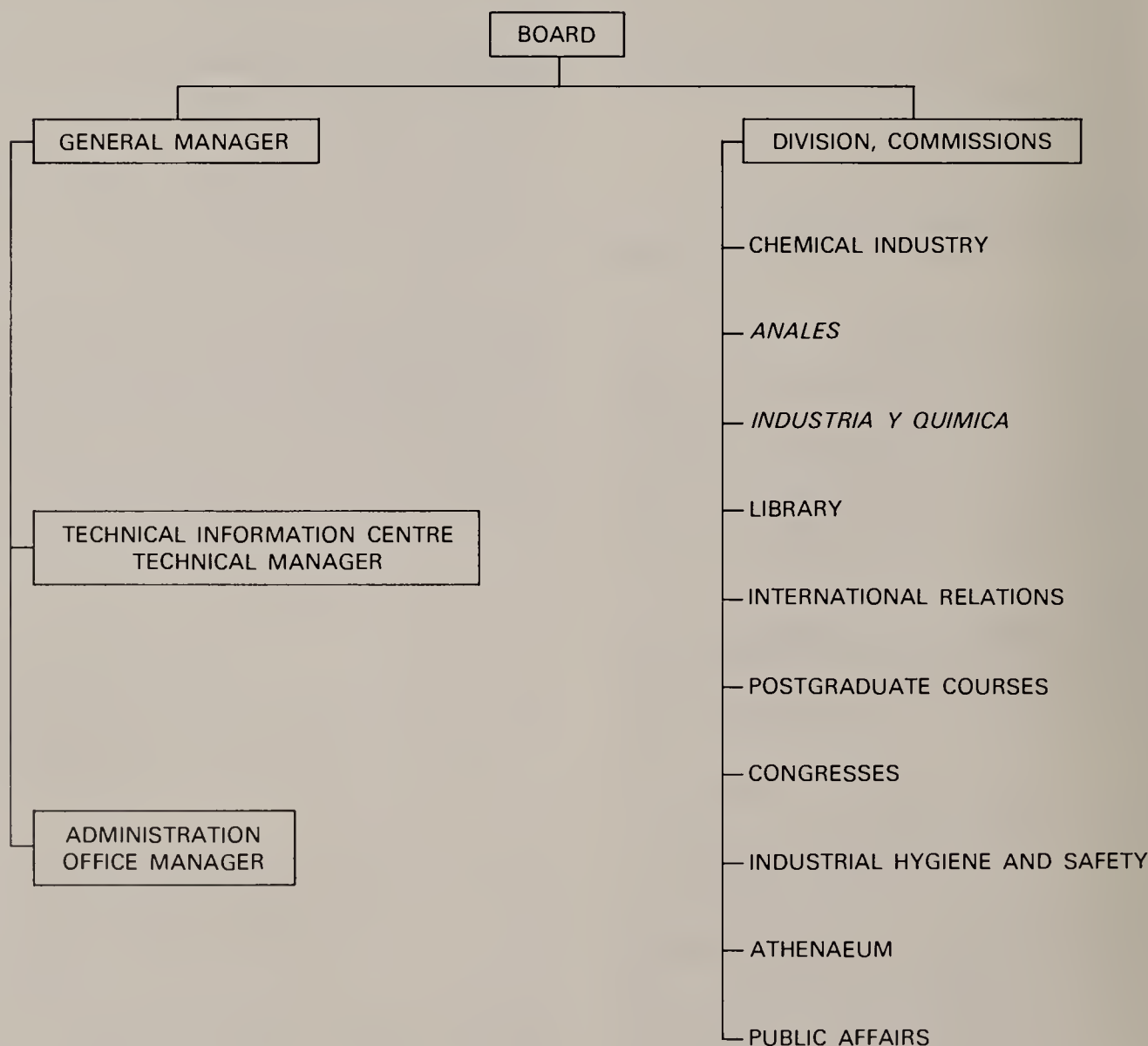
The governing bodies of the Association are elected by the members at the annual assemblies. The Officers of the various bodies indicated in the following structure report to the Board:

Present activities

Among other functions, AQA provides technical advice to government agencies, and recommendations for the enactment of legislation concerning science and industry in chemical fields.

The Technical Information Centre was formed by AQA in 1980, through agreements with official, scientific and technical bodies. Its main purpose is aimed at gathering and disseminating chemical information, thus providing fluid communications and better interaction between industry and science. Quite recently a Hewlett-Packard 150 computer has been installed, which will allow the implementation of an ambitious project related to computerized databases.

AQA, with the cooperation of university professors, maintains a programme of post-graduate courses covering subjects of specific interest, such as chromatography, mass spectroscopy, chemical applications of personal computers, etc. The success achieved by this



programme has encouraged the Association to establish relations with other chemical societies also involved in similar programmes.

International activities

Our relations with IUPAC merit a special paragraph. AQA has had the privilege of being the Argentine National Adhering Organization since 1930, apart from a short gap in the 1950s. Many local scientists have participated in the work of Commissions and Committees ever since. There are at present 11 representatives:

Dr A. J. Arvía — Commission on
Electrochemistry (I.3)
(National Representative)

Dr J. Baran — Commission on High
Temperature and Solid State Chemistry (II.3)
(National Representative)

Prof L. F. Bertello — Commission on
Nomenclature of Inorganic Chemistry (II.2)
(National Representative);
Commission on Quantities and Units (VII.2)
(Titular Member)

Dr J. H. Cappacioli — Commission on
Spectrochemical and Other Optical
Procedures for Analysis (V.4)

(National Representative)

Dr R. J. Ertola — Commission on Biotechnology
(VI.2)

(National Representative)

Prof A. H. Guerrero — Committee on Teaching
of Chemistry (CTC)

(National Representative)

Dr E. M. Macchi — Commission on
Macromolecular Nomenclature (IV.1)

(National Representative)

Dr A. J. Maroto — Commission on Colloid and
Surface Chemistry including Catalysis (I.6)
(Associate Member)

Dr Ana María Pechen de D'Angelo —
Commission on Pesticide Chemistry (VI.5)
(National Representative)

Dr R. Fernández Prini — Commission on
Solubility Data (V.8)
(National Representative)

Prof J. A. Retamar — Commission on
Nomenclature of Organic Chemistry (III.1)
(National Representative)

At the 32nd IUPAC General Assembly in Lyngby,
Dr A. J. Arvía was elected to the Bureau for the
term 1983–1987.

J. Mazar Barnett



Dr J. Mazar Barnett

Director

Dr C. Roitman

Secretary

Dr M. A. Crivelli

President

Officers of the Asociación Química Argentina

CODATA — The ICSU Committee on Data for Science and Technology

An article on CODATA appeared in the *IUPAC Information Bulletin* (1978, No. 3, pp. 225–227). There will undoubtedly be people who read that article who are still active in IUPAC but there must be a large number now in the Union who did not. To the first people I apologize for repeating, even though in different words, old stuff you already know; to the second I can only say I hope you find this article interesting and that it will help you to appreciate how IUPAC, a source of a great many chemical data collections, and CODATA interact.

The collection, evaluation and publication of scientific data has traditionally been done by individuals interested in a narrow field of work, by public institutions, by some international scientific unions (including IUPAC), by scientific societies, by industrial associations and by commercial firms offering their compilations for sale. So much uncoordinated effort was inevitably inefficient both in terms of coverage and effort. In the early 1960s the USA, USSR and other countries started major national programmes to achieve more comprehensive and systematic approaches to the problem, but it was realized that even they would find the task very costly and that there was duplication of effort in different countries and different scientific disciplines. Some coordinating mechanism to deal with both the international and interdisciplinary aspects of scientific and technical data was clearly needed. Accordingly, in 1966, CODATA was established by ICSU '... to promote and encourage on a worldwide basis the production and distribution of collections of critically selected numerical values of properties of substances of importance to science and technology.'

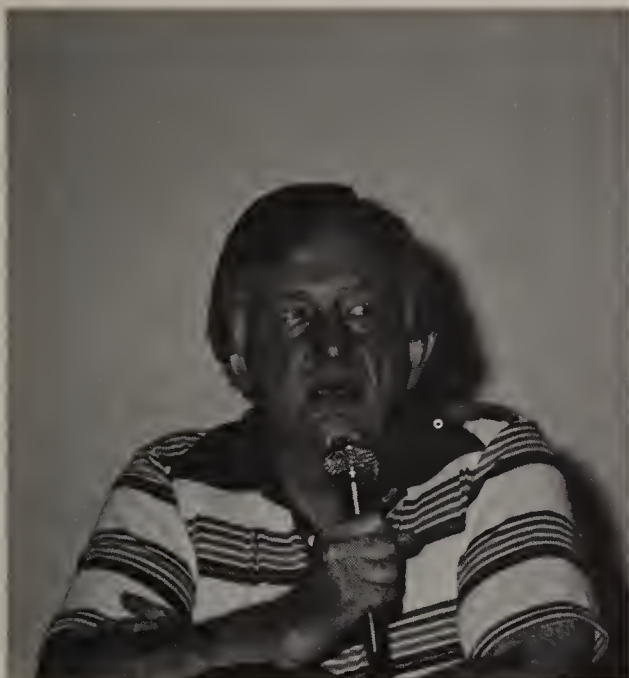
The Committee was at first concerned mainly with physics and chemistry but has expanded its scope to include non-numeric data and time- and place-dependent data and now fully embraces the bio- and geo-sciences; it is especially concerned with data of interdisciplinary significance and with projects that promote international cooperation in the compilation and dissemination of scientific data. The revised CODATA Constitution, approved by the CODATA General Assembly 1984, contains under Statute 2, Objectives, the following paragraph:

'2.3 Specifically, CODATA will:

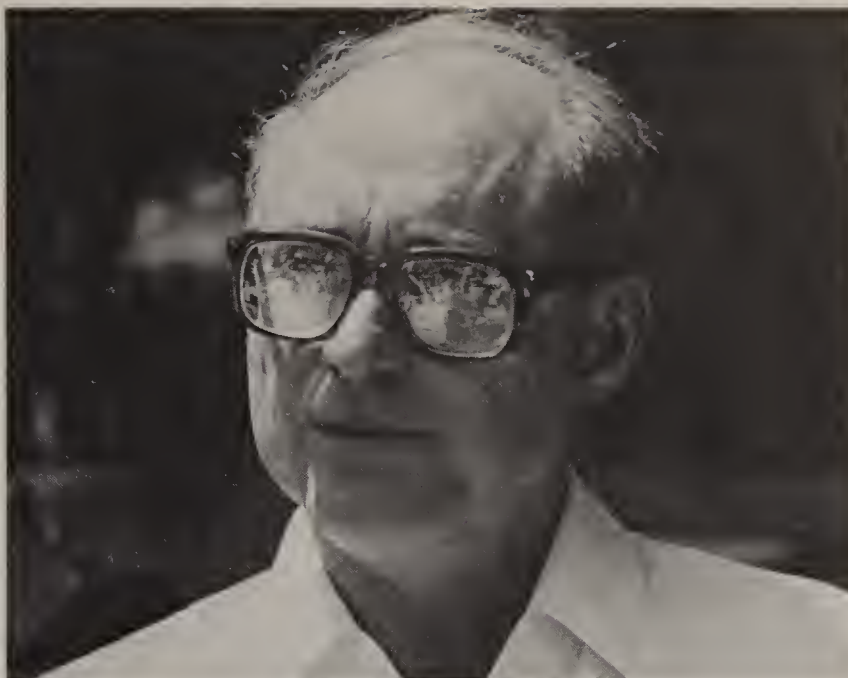
- a Compile and critically evaluate, or encourage compilation and critical evaluation of, key sets of scientific data of special importance.
- b Study methodologies for evaluation, management, analysis, and dissemination of data, including means of maximizing the compatibility of data bases from different sources.
- c Enhance coordination of data projects in order to provide consistent formats, maintain standards, or facilitate conduct of the work and encourage standard interchange formats for data.
- d Establish and/or maintain directories on sources of data.
- e Undertake pilot projects to evaluate the feasibility of building data bases or data systems.
- f Stimulate experimental determinations, theoretical calculations or correlations, and observations which are crucial to completion of evaluations of data sets.
- g Encourage usage of symbols, units, nomenclature, terminology, constants, etc., that are advocated by the responsible Unions.
- h Foster exchange of relevant information and ideas by meetings, publications, training courses, and other appropriate means.
- i Provide advice to ICSU, to its Unions, and, as appropriate, to other international bodies. Collaborate with such bodies in carrying out projects of mutual interest.'

Organization

The governing body of CODATA is its General Assembly, composed of delegates from its member countries (18) and ICSU Scientific Unions (16) plus coopted delegates (2), which meets biennially. A brief report on the 1984 General Assembly appears on p. 16. Much of the administrative work is delegated to the Executive Committee, which meets annually, consisting of the Officers (President, Past-President, Vice-President, Secretary General and Treasurer) and members elected by the General Assembly. The day-to-day running of the Committee is



Dr W. W. Hutchison, President



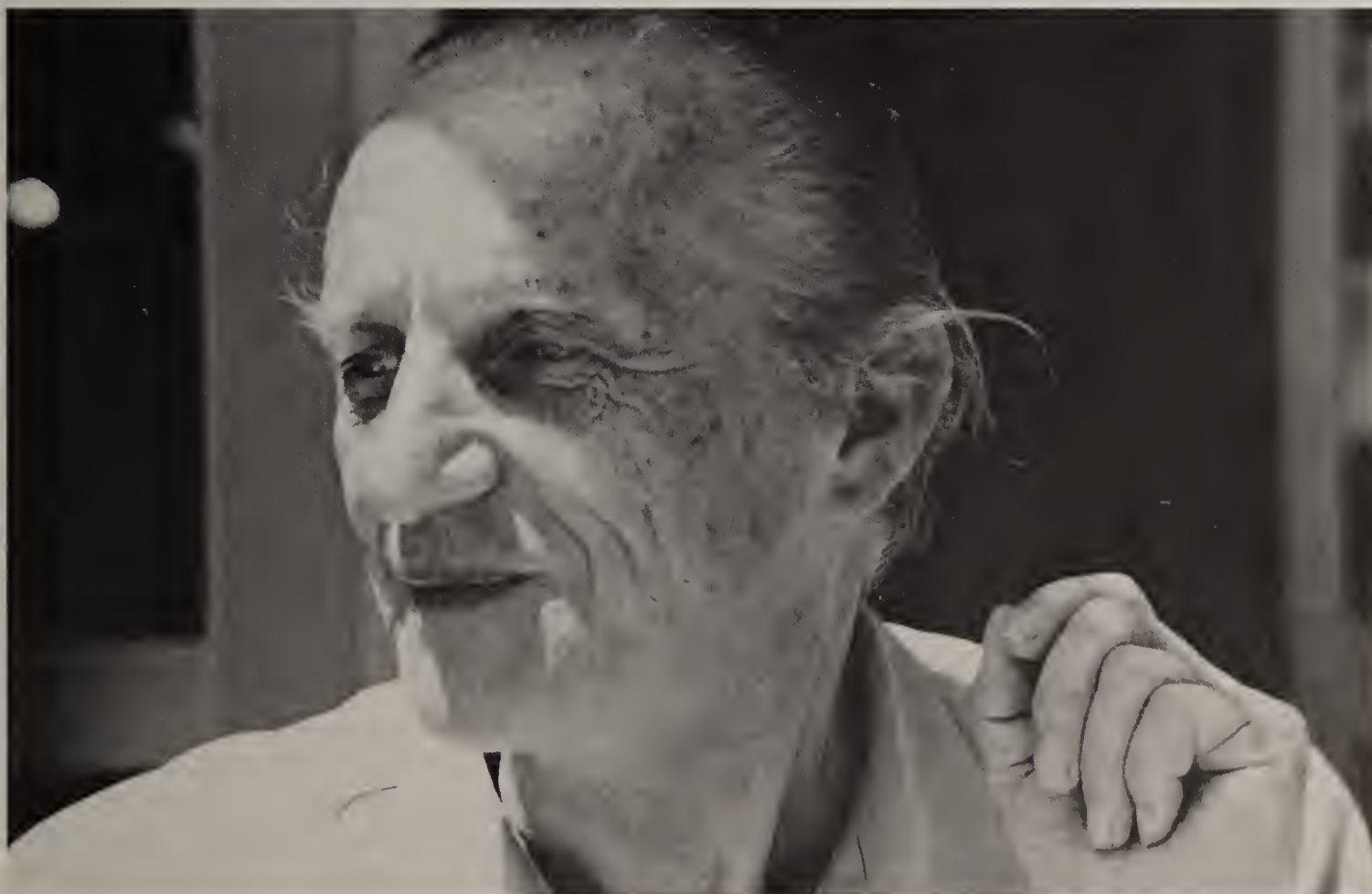
Dr D. R. Lide, Jr, Secretary General



Dr D. G. Watson, Treasurer



Professor J. E. Dubois, Vice-President



Professor A. Bylicki, Vice-President

The Officers of CODATA.

in the hands of the Executive Secretary, Mrs Phyllis Glaeser, under the authority of the Secretary General. The Secretariat is in the Hotel de Noailles, 51 Boulevard de Montmorency, 75016 Paris, France — together with the secretaries of ICSU and other bodies.

To provide the opportunity to keep in touch with bodies not eligible for full membership, CODATA has its 'Supporting Organizations'. This class of membership is open to, for example, industrial firms, data and information centres, databank operators, laboratories interested in data.

Activities

The scientific effort of CODATA is achieved by Commissions, Task Groups (TGs) and Working Groups (WGs). The job of the Commissions is to help in the general planning, guidance and criticism of the TGs and WGs. There is some restructuring going on in this organizational area so that there may soon be more Commissions than the one existing at the moment, the Commission on Data for Industry. Task Groups and Working Groups have specific objectives, the WGs' objectives being the shorter-term. Those active in the 1985–86 biennium will include:

Task Groups:

- Chemical Thermodynamic Tables
- CODATA Referral Data Base
- Critically Evaluated Phase Equilibrium Data
- Data for the Chemical Industry
- Fundamental Physical Constants
- Geothermodynamic Data
- High Pressure Data
- Hybridoma Data Bank
- Coordination Protein Sequence Data Banks
- Data for Surveillance of Active Volcanoes
- Multisatellite Thematic Mapping

Working Groups:

- Environmental Data Needs
- Microbial Strain Data

It is not appropriate in this short article to go into full details of the programmes of these TGs and WGs. However, a few examples of current CODATA projects will be given. Many scientists and engineers are poorly informed about sources of good data, even in technologically advanced countries let alone developing ones, and hence there has been a project to correct this. The results of this work can be seen in the production of a *Directory of Data Sources for Science and Technology*, up to the present issued in chapters as CODATA *Bulletins*. Eleven chapters have been published to date — Crystallography, Hydrology, Astronomy, Zoology, Seismology, Chemical kinetics, Nuclear and elementary particle physics, Atomic and

molecular spectroscopy, Geodesy, Snow and ice, Chemical thermodynamics. (The interdisciplinary nature of this work is obvious and is a good example of how CODATA can draw all these disciplines together.) In parallel with completing the hard-copy chapters, the possibility of producing a machine-readable version, suitable for on-line computer access, is being explored by a newly formed Task Group. With the support of UNESCO, CODATA also has produced a 229-page book — directed particularly at the needs of developing countries — entitled *Inventory of Data Sources in Science and Technology: A Preliminary Survey*.

To develop easy access by scientists to internationally generated scientific data it is necessary to have some standardized formal structure for presenting, exchanging and accessing numerical data — best done by utilizing computer systems. A TG on Computerized Data Handling was formed early in CODATA's history to foster cooperation in this field across the boundaries of disciplines, computing systems and countries. Its first achievement was the publication of a survey — *Automated Information Handling in Data Centres* — in 1969, updated in 1971. In order to bring the systems' users together, the TG organized the Symposium on Man–Machine Communication for Scientific Data Handling in 1973. This seemed to have the desired effect in that members of differing disciplines realized that their problems were often common and hence that a common approach, achieved by international cooperation via CODATA, should be beneficial.

CODATA has worked with its member Unions to promote computerized methods of handling and distributing scientific data. For example, it joined the International Union of Immunological Sciences (IUIS) two years ago to establish a pilot Data Bank on Hybridomas and Monoclonal Antibodies. The consulting and advisory role of CODATA has particular relevance to IUPAC at the present time. IUPAC Advisory Committee on Chemical Data Bases (see *CI*, 1984, No. 5, p. 42) which met in June 1984 contained two people from CODATA.

An important CODATA activity is the organizing of biennial international conferences. There are occasions not only for the presentation of general and specialized topics of relevance to the CODATA programme but also for open discussion on the work of the TGs and WGs. As another example of the scope of CODATA interest, the 23 symposia organized at the 9th International CODATA Conference, Israel, June 1984, included:

- Towards a human protein map
- X-ray structure, storage and retrieval, and correlation of protein nucleic acid structural data



Prof E. F. Westrum, Jr, IUPAC Representative, and Mrs P. Glaeser, Executive Secretary, CODATA.

Data needs for genetic engineering/
biotechnology

Phase equilibria: Data banks and process
calculations

Compilations in elementary particle physics
Management and analysis of numerical data
in geochemical exploration

Solid-seawater equilibrium data

Environmental, chemical and toxicological
databases

Numerical data for nuclear energy

Databases in ecology and systematics

Automatic information retrieval in the
sciences

Environmental modelling.

The proceedings of these conferences are published in book form, with abstracts and/or selected papers appearing as CODATA *Bulletins*.

Publications

All CODATA publications are primarily in English. The CODATA *Newsletter* is published four times annually, and is distributed free of charge to interested recipients throughout the world. Items thought to be of interest to IUPAC people have been mentioned regularly in *CI*.

The CODATA *Bulletin* is available by subscription from Pergamon Press and, since most issues deal with a single subject, individual copies may be purchased. It is published irregularly as suitable material becomes available. The subjects include chapters of the *Directory of Data Sources for Science and Technology*, reports from TGs and abstracts or papers from CODATA international conferences.

Occasionally CODATA *Special Reports* are published. These are for limited distribution on specific topics.

Some of the books published by CODATA have been mentioned earlier. Two books are in preparation — *Method for Coding Data for Microbial Strains for Computer* and *Key Values for Chemical Thermodynamics*.

Finally, to bring you more up to date, we quote, Appendix I, the annual report of the CODATA Secretary General, Dr D. R. Lide, Jr* (also current President of IUPAC Division I) and, Appendix II, the highlights of the 1984 CODATA General Assembly, as seen by the IUPAC representative on CODATA, Prof E. F. Westrum, Jr.

*To whom the Editor is grateful for corrections and amendments to his original manuscript.

Appendix I

REPORT OF THE COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY

by Dr David R. Lide, Jr, Secretary General, CODATA

This report covers the period from 15 May 1983 to 15 May 1984.

New Members

South Africa was admitted to CODATA in February 1984, bringing the number of national members to 17. Admission of the People's Republic of China, which applied in May 1984, is expected at the General Assembly to be held in June. The International Union of Microbiological Sciences (IUMS) is also expected to become a member at that time.

Planning Conference

A conference to discuss the future programme of CODATA was held in July 1983 at La Gaillarde, France. In addition to the CODATA Executive Committee, the participants included leaders concerned with data in the various disciplines represented in CODATA. The conference set priorities for CODATA activities, emphasizing joint projects with the ICSU Unions and efforts to coordinate database development on an internal and interdisciplinary basis. A report on the conference has been issued as a CODATA Special Report.

Major Scientific Activities

The scientific activities of CODATA are conducted by its Task Groups and Working Groups. Highlights of activities during the last year include:

Hybridoma Data Bank: The CODATA-IUIS Data Bank on Hybridomas and Monoclonal Antibodies became operational in 1983. The objective of this databank is to maintain a computer-readable record of hybridomas produced throughout the world, including information on method of production, antibodies generated, and availability of cultures. The databank is intended to perform a service to the scientific community, and it is hoped that broad participation by those involved in hybridoma research can be achieved. Financial support comes from several countries, IUIS, WHO, and CODATA itself. The central project is located in the United States, but nodes are planned in Japan and Europe.

Fundamental Physical Constants: A new

analysis of the fundamental constants is almost complete, and a recommended set of constants is expected to be released in the second half of 1984. This will replace the 1973 CODATA recommendations, which were adopted by the Unions and most national bodies.

Chemical Kinetics: A supplementary set of rate constants of reactions of interest in atmospheric chemistry has been completed and is in press. These CODATA recommended values have become the generally accepted input data for modelling the ozone depletion which might result from stratospheric pollution.

Others: Progress was made by several other Task Groups, including those dealing with bi-thermodynamic data, standard data for calibrating thermophysical property measurements, international thermochemical tables, and multi-satellite thematic mapping.

Publications

Chapters of the *CODATA Directory of Data Sources for Science and Technology* dealing with geodesy, snow and ice, and chemical thermodynamics have appeared during the reporting period. These list data centres, national and international organizations, and other sources which provide data in the subject areas indicated. Other chapters in preparation include oceanography, geomagnetism, toxicology, nutrition, and others.

A source book entitled *Database Management in Science and Technology* edited by J. R. Rumble and V. E. Hampel, was published in March 1984. This book presents current information on computer software and hardware applicable to the management of data in different scientific disciplines. It is aimed at the working scientist who needs advice on the simplest and most economical method of handling his data problems.

The CODATA *Newsletter* is now being published on a quarterly basis.

Finances

Revision of the schedule of national dues has been discussed in considerable detail by the Executive Committee, and a new scheme will be presented to the General Assembly in June 1984. If adopted, it will go into effect in 1986.

Constitution

The 1984 General Assembly will be asked to ratify a revised Constitution for CODATA. In addition to certain changes in the terms of office and eligibility of the Officers, Executive Committee, and Delegates, the new Constitution clarifies and extends the objectives of CODATA.



Above: C. Alcock (standing left) makes a point on the presentation by R. E. Cohen (standing right). Do you recognize anybody at the table on the right?



Left: Is M. Kotani illustrating the size of the problem to H. Behrens?

Right: The 'top table' takes a point from the meeting. Left to right: D. G. Watson, Mrs P. Glaeser, W. W. Hutchison, D. R. Lide, J. E. Dubois, M. Kotani.



At the CODATA General Assembly, Israel, June 1984.

Appendix II

Highlights of the 1984 CODATA General Assembly

THE GENERAL ASSEMBLY . . .

New Members

. . . unanimously accepted the People's Republic of China as a national member of CODATA and welcomed both the Republic of South Africa and the International Union of Microbiological Sciences which had become Members since the last General Assembly.

Revised Constitution

. . . unanimously approved the revised version of the CODATA Constitution, subject to approval by the Executive Board of ICSU.

Restructuring

. . . agreed to the restructuring of Committees, Task Groups, and Working Groups as proposed by the Executive Committee. In order to adhere more closely to the Scientific Union nomenclature, former Advisory Committees will be called Commissions, and their purpose will be to aid in the general planning guidance, and criticism of the CODATA Task Groups and Working Groups. Task Groups and Working Groups will conduct specific short-term projects.

Task & Working Groups

. . . renewed the following Task Groups (TG) and Working Groups (WG) for the period 1984–86:

- TG Chemical Thermodynamic Tables
- TG Data for the Chemical Industry
- TG Fundamental Constants
- TG Critically Evaluated Phase Equilibrium Data
- TG Hybridoma Data Bank
- TG High Pressure Data
- WG Data for Surveillance of Active Volcanoes
- WG Multisatellite Thematic Mapping
- WG Coordination Protein Sequence Data Banks

. . . did not renew the following Task Groups and Working Groups:

- TG Biothermodynamic Data
- TG Gas Phase Chemical Kinetics
- TG Thermophysical Properties of Solids
- WG Environmental Sciences Data

. . . established the following new Task Groups and Working Groups:

- Task Group on Geothermodynamic Data
- CODATA Referral Data Base
- Task Group on Microbial Strain Data Network
- Working Group on Environmental Data Needs (new WG to replace Environmental Sciences Data)

. . . renewed the Commission (formerly 'Committee') on Industrial Data for the period 1982–84.

. . . asked the Executive Committee to investigate the transformation of the Task Groups on Accessibility & Dissemination of Data and Computerized Data Handling into Commissions and to recommend whether or not there is a need for the establishment of discipline-oriented Commissions, i.e. Biosciences, Geosciences, Physics, Chemistry, etc., and other methodology-oriented Commissions, i.e. Education.

Fiscal Policy

. . . adopted (after approval of the Treasurer's report) several resolutions regarding payment of dues, established a category model related to the ICSU scale, assigned subscription units, and voted to implement the scheme over a five-year period.

Chosen

. . . elected:

- A. Bylicki (Poland) to a Vice Presidency
- H. Behrens (FRG), M. Carapezza (Italy), Y. Mashiko (Japan) to Executive Committee membership

. . . reelected:

- J. E. Dubois (France) to a Vice Presidency
- D. G. Watson to the Treasurer's post
- A. E. Bussard (IUIS), H. Haendler (IUNS), and E. F. Westrum, Jr (IUPAC) to Executive Committee membership.

E. F. Westrum, Jr

THE STANDARD STATE PRESSURE IN CHEMICAL THERMODYNAMICS

by Dr S. Angus, Commission I.2

In Appendix IV¹ to the IUPAC *Manual of Symbols and Terminology for Physicochemical Quantities and Units*,² the IUPAC Commission on Thermodynamics recommended that, in future, data in chemical thermodynamics should be reported for a defined standard state pressure of 10^5 Pa, instead of at 1.01325×10^5 Pa (1 atm) as has hitherto been the custom. This recommendation, which is but one example of the steady growth of the use of SI units, caused considerable comment, not least because the style of publication did not lend itself to the inclusion of reasons for the recommendation, and so it would be useful to set out the reasoning of the Commission.

It is a truism of metrology that the establishment of a scale for any measurable property requires the definition of the magnitude of a unit and of a point at which the property is assigned a value of zero. The units of all thermodynamic properties are established on the basis of the fundamental SI units, but some properties, such as energies and entropy, can only be measured as differences, and the choice of the zero reference point is arbitrary; since in many cases the values have to be obtained by calorimetry, it is convenient to use ambient conditions.

For a pure substance existing in a single phase, the definition of a reference point for an energy or the entropy requires the specification of two other thermodynamic properties and the phase of the substance. In chemical thermodynamics the most widely used system first defines a standard state for the pressure, then the state of aggregation of the substance, and finally a standard state for the temperature. Historically, this system antedates the adoption of SI units and the standard state pressure has customarily been taken as 1 atm, which is equivalent to 1.01325×10^5 Pa. With the rise of the SI it becomes difficult, especially in teaching, to justify the continued use of a standard state pressure which is seen to be an awkward and arbitrary number. An appeal to history is rightly seen as irrelevant: if it were possible to change the entire system of units in use in all science, why should one particular value be sacrosanct? From the pedagogical point of view, the argument is not whether the change should be made, but how soon.

Users of tables would also benefit from a change. The basic tables of values to be used give properties over a range of temperatures at the standard state pressure, or an equivalent



Dr S. Angus, Commission I.2

equation, but modern tables of other properties, whose makers are not bound by the standard state definition, naturally publish in round values of pascals or bars, so that in linking between them a pressure correction has constantly to be applied. In recommending a change, it is advantageous to choose the new pressure so as to cause as little disruption as possible, and the obvious choice is 10^5 Pa. This choice is experimentally convenient and accurately realizable, and involves no theoretical difficulties in calculations. As compared with the previous standard state pressure, the new choice causes significant changes only in standard electrode potentials and in the entropy (and hence in the Helmholtz energy and the Gibbs function) of substances which are gases in their standard states. A detailed and careful study of the effects of the change will be found in a paper by Freeman,³ study of which is recommended.

There will be difficulties in the transition stage. There is the problem that most existing publications are based on 101 325 Pa: it is reasonable to suppose that a publisher who has just issued a new set of tables will oppose the change, but equally reasonable to suppose that one about to prepare such a set will favour the change. This demonstrates that such arguments are really about when the change should be made, and are distinct from arguments about its desirability. It is also argued that the change will

not be accepted by scientists in general. This argument is raised whenever a change of a similar nature is proposed; and it has been found that, whether it is a general change, such as the introduction of the SI units, or a more specialized and more similar change, such as the redefinition of the bases of the temperature scale, or the change from gauge pressure to absolute pressure in engineering, the difficulties and the resistance to change are always overestimated.

It is curious that most of the objections which were made devote considerable space to the effect that this will have on the normal boiling point temperatures or 'boiling points' of compounds. The Appendix states in so many words: 'It should be understood that the present recommended change in the standard state pressure, carries no implication for "standard pressures" used in other contexts, e.g. the convention that "normal boiling points" refer to a pressure of 101 325 Pa (1 atm).' The recommendation in Appendix IV is specifically concerned with the standard state pressure for use with thermochemical properties: the boiling point is not one of these properties, but is basically an identification parameter used in analytic work. The confusion has probably arisen because the two concepts have hitherto used the same magnitude of pressure, but this is purely adventitious. The Commission on Thermodynamics takes the view that any suggestions for change in the pressure at which the normal boiling point is defined should come from those who are most concerned in using it.

A parallel is sometimes drawn between the non-integer magnitude of the standard state pressure and that of the most common standard state temperature, 298.15 K, in some cases to urge the retention of 101 325 Pa, in other cases to urge the adoption of 300 K. The parallel does not hold. Because of the order of specification of

the three elements necessary to define a standard state — first, pressure; second, state; third, temperature — it is convenient to print tables showing the variation of properties with temperature at the standard state pressure. Thus in practical terms a change in standard state pressure is of more consequence than one in temperature. (It seems hardly necessary to add that the usual standard state temperature is an integral magnitude on the Celsius scale, the working scale of laboratories experimenting in this region.)

Summing up, we believe that the change we recommend will be made sooner or later, and from the pedagogical point of view the sooner the better and we do not believe that the transition period will be any more difficult than, say, that during the change from calories to joules.

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33rd General Assembly

Amendments to the timetable of meetings

Commission on Nomenclature of Inorganic Chemistry	24–29 August (11)	
Applied Chemistry Division Committee (Applied Chemistry Division Committee meeting originally scheduled for 14–18 on Tuesday, 3 September, is cancelled.)	Saturday 31 August	10–13 (32)

Additional Meetings

Harmonization of Collaborative Analytical Studies — Representatives from Analytical, Applied and Clinical Chemistry Divisions	Sunday 1 September	9.30–13 14–16 (23)
Commissions V.1 and V.3 (joint meeting)	Sunday 1 September	17–19* (2)

IUPAC-SPONSORED CONFERENCES

Details available on IUPAC-sponsored conferences up to May 1985 are given below. The latest brochures are available from the organizers listed on p. 29

5th International Symposium on Hydrogen in Metals

Belfast, Northern Ireland, 26–29 March 1985

The scientific sessions of the symposium will be held in the David Keir Building of the Queen's University of Belfast which is situated not far from the city centre. Upwards of one hundred lectures will be presented. There will be an initial session of three lectures involving the whole audience on each day, followed by parallel sessions. On the last day the final session again will be common to the whole audience. Presentations by poster are being facilitated.

The subjects of the lecture programme will cover a wide range of topics including various thermodynamic considerations of the three hydrogen isotopes in metals, kinetics of hydrogen absorption, diffusion phenomena, structures of hydrides and phase transitions, effects of hydrogen on elastic, anelastic and other physical properties of metals. Some papers will be more specifically concerned with related technological aspects such as corrosion, embrittlement and the employment of hydrides as hydrogen storage and heat pump materials.

Lectures to be presented at initial morning sessions and the final session include:

Present and future aspects of metal–hydrogen systems (E. Wicke, FRG)

New phase transformations in hydrides of I, III and IV Group metals (E.G. Ponyatovskii and L.O. Bashkin, USSR)

Nuclear magnetic resonance studies of hydrogen diffusion, trapping and site occupation in niobium (R. Messer, A. Höpfel, W. Zag, C. Schmidt and A. Seeger, FRG)

Tritium in metals (R. Lässer, FRG)

Elastic and anelastic properties of metal–

hydrogen systems (F.M. Mazzolai, Italy)

Effect of oxide layers on the absorption and desorption kinetics of hydrogen at ambient temperatures (E. Fromm, FRG)

Recent X-ray and neutron diffraction studies of hydrogen in metals (J. Peisl, FRG)

Diffusion and tunnelling of hydrogen in metals (H. Wipf, FRG)

Metal hydrides for heat pump applications (M. Ron, Israel)

Low temperature diffusion of hydrogen isotopes and the formation of diatomic complexes in diluted Ni-, Fe-, and Pd-alloys (H. Kronmüller, G. Higelin, P. Vargas and R. Lässer, FRG)

Pre-transition phenomena in metal hydrides (H.K. Birnbaum, USA)

Structural features of Rare Earth hydrides (B. Stalinski, Poland)

Evaluation of hydrogen diffusivity in mild steel from electropermeation transients (B.S. Chaudhari and T.P. Radhakrishnan, India)

Diffusion elastic effect and the measurement of diffusivity of hydrogen in a crystal lattice with trapping sites (J. Cermak, G. Gardavska, A. Kufudakis and P. Lejcek, Czechoslovakia)

Formation and decomposition kinetics of nickel hydride in high pressure conditions (B. Baranowski, Poland)

Accommodation will mainly be in the University Halls of Residence and in local hotels. The basic conference fee is US\$120 exclusive of bound volumes of symposium proceedings. A reduced fee will be charged to research students.

2nd International Symposium on Analytical Chemistry in the Exploration, Mining and Processing of Materials

Pretoria, RSA, 15–19 April 1985

The aim of this Symposium, to be held at the CSIR Conference Centre situated in the eastern outskirts of Pretoria, is to provide a forum for the exchange of knowledge on the most recent developments in all aspects of analytical chemistry applied to inorganic materials, from the natural ones to the finished products.

The scientific programme will consist of overview lectures (45 min) by invited speakers and research papers (20 min), in plenary, parallel and discussion sessions. The official language is English.

The registration fee will be R260 before 15 March

1985 and R300 thereafter. It is important to check that any necessary visa and health documents are obtained. At the time of the Symposium, early autumn in South Africa, about 10 hours of sunshine a day may be expected with temperatures in Pretoria ranging between 16°C and 28°C.

Pretoria is the administrative capital of South Africa and is situated on the Transvaal Highveld at an altitude of about 1300 m above sea level. It forms the apex of the country's most important industrial area, the Pretoria–Witwatersrand–Vereeniging complex.

8th International Conference on Solid Compounds of Transition Elements Vienna, Austria, 9–13 April 1985

The scientific sessions of the conference will take place in the Technische Universität and will be concerned with the structural, physical and chemical properties of solid compounds of the transition elements, especially those containing hydrogen, boron, carbon, silicon, germanium, tin, nitrogen, phosphorus, arsenic, antimony, bismuth, sulphur, selenium and tellurium. Contributions on prospective technical applications of these materials will also be welcome. The programme includes invited lectures and contributed papers as either oral or poster presentations.

The *invited lectures* will be:

- Ternary transition metal chalcogenides with framework structures and the characterization of their bonding by magnetic properties (W. Bronger, FRG).
- New examples of clusters, extended metal–metal bonding, and interstitial derivatives (J. D. Corbett, USA).
- One-electron theory of transition metal compounds and their surfaces (A. J. Freeman, USA).

Synthesis and thermochemistry of non-stoichiometric rare earth chalcogenides, pnictides, and hydrides under extreme conditions (E. Kaldis, Switzerland).

Crystal chemistry of transition metal borides (Yu. B. Kuzma, USSR).

Electron microscopy and diffraction of modulated structures (J. van Landduyt, Belgium).

Structure, defects, and properties of refractory borides (T. Lundström, Sweden).

Order and disorder in transition metal carbides and nitrides: Experimental and theoretical aspects (C. H. de Novion, France).

Intercalation reactions of transition metal compounds via electron/ion transfer (R. Schöllhorn, FRG).

Recent developments on solid state magnetism with special reference to transition metal compounds (E. P. Wohlfarth).

The Conference fee up to 15 February 1985 is AS 2500 and after that date AS 2800.

International Symposium on Non-crystalline Order in Polymers Naples, Italy, 27–30 May 1985

The Symposium (NCOP-85) is a single-topic meeting designed to allow discussion on the most recent position on the problems of non-crystalline and, particularly, liquid-crystalline order in polymeric systems. Topics to be covered include — Theoretical foundations for the occurrence of non-crystalline order in polymers; chemical and physical means to produce non-crystalline order; detection and quantification of molecular motion and order in non-crystalline polymers; rheology of ordered polymeric fluids; processing of ordered non-crystalline polymeric materials; influence of non-crystalline order on the final properties of polymeric products.

The scientific programme will include invited lectures and contributed papers. The latter will not be formally presented but discussed in sessions guided by discussion leaders. English will be the official language of the Symposium.

The *invited lectures* to be given are:

- Problems and opportunities with melt processible mesomorphic systems (J. Economy, USA).
- Theoretical foundations of the occurrence of non-crystalline order in polymers (P. J. Flory, USA).
- The preparation and structure–properties relationships of main-chain liquid crystalline polyesters (R. W. Lenz, USA).
- Rheology of liquid crystalline polymers (G. Marrucci, Italy).

Mesophase pitch and its carbon fibres (T. Matsu-moto, Japan).

Spectroscopic investigation of local molecular dynamics of non-crystalline ordered polymers (L. Monnerie, France).

Effect of orientation on gas sorption and transport in polymers (D. R. Paul, USA).

Synthesis and structure of liquid crystalline polymers (V. Shibaev, USSR).

The characterization of molecular order in solid polymers by rheo-optical FTIR spectroscopy: recent advances (H. W. Siesler, FRG).

Deuteron NMR methods for studying molecular order and motion in solid polymers and liquid crystalline polymers (H. W. Spiess, FRG).

Diffraction methods in the study of the structure of non-crystalline and liquid crystalline order (A. H. Windle, UK).

The registration fee for active participants is US\$150 but paid in Italian lire. The Symposium will be held in the Castel dell'Ovo, a medieval fortress built in the 12th century on the site of a Roman villa. It has recently been restored and modernized internally to make it suitable for conferences and meetings. The weather in May should be pleasantly warm with a maximum temperature of 24°C, minimum 15°C, although there is a risk of some rain.



Castel dell'Ovo, Naples (Photo courtesy of Archivio Fotografico, Ente Provinciale Turismo di Napoli).

Imperial College Thermophysical Properties Data Centre

The Imperial College Thermophysical Properties Data Centre was established in July 1983 as part of a United Kingdom national data service and works in cooperation with the Physical Properties Data Service (PPDS) of the Institution of Chemical Engineers and the National Engineering Laboratory (NEL). The Centre incorporates the existing IUPAC Thermodynamic Tables Project Centre and a similar new IUPAC Project Centre for Transport Properties. The Centres are integral parts of the Department of Chemical Engineering and Chemical Technology of Imperial College, London, and have close links with the research carried out there on the thermophysical properties of fluids.

The IUPAC Thermodynamic Tables Project Centre is long established. It has been publishing International Thermodynamic Tables of the Fluid State for more than ten years and continues to do so. The new IUPAC Transport Properties Project Centre follows the same aim by producing high-quality correlations of the transport properties of fluids which will be published as scientific articles.

The Imperial College Centre gives particular attention to the development of computer packages for use in industry which are available directly from the Centre or through PPDS.

Financial support for the Imperial College Centre is provided by the United Kingdom Department of Trade and Industry. Income is also derived from

direct subscription by industrial organizations, from royalties on books published by the Thermodynamics Centre and from the sale and leasing of computer packages.

The Director of the Imperial College Centre, Dr W. A. Wakeham, is Reader in the Chemical Physics of Fluids in the Department of Chemical Engineering and Chemical Technology and has many years' experience of both theoretical and experimental work on the transport properties of fluids. The scientific staff of the Centre consists of four members headed by Mrs K. M. de Reuck who has been a member of the IUPAC Thermodynamic Tables Project Centre since its inception. Each member of the staff has a special responsibility for one area of activity while all contribute collectively to its unified computer packages.

The staff is completed by Dr S. Angus, Secretary of the Commission on Thermodynamics and until recently Scientific Director of the IUPAC Centre, and by Prof J. Kestin, Chairman of the IUPAC Subcommittee on Transport Properties, who are jointly responsible for international liaison.

Computer packages

The Physical Properties Data Service (PPDS) comprises a suite of computer programs which provide thermophysical properties for over 1200 substances.

One of these packages has been written by the Imperial College Thermophysical Properties Data Centre. It contains high-accuracy correlations of reliable experimental data for a limited set of fluids. At present the package provides the thermodynamic properties of argon, carbon dioxide, ethylene, methane, nitrogen, oxygen, propylene, n-hydrogen, ethane and propane. New fluids will be added to this list each year and, beginning in 1984, the package will be extended to include reliable values of the viscosity and thermal conductivity of some of these fluids. The package is regularly updated to incorporate improved correlations.

Other computer programs are available, direct from the Imperial College Centre, which perform specific tasks. For example, one such program implements an algorithm to represent a set of data by an equation consisting only of the statistically significant terms from among a predetermined set.

International collaboration

International collaboration has been at the heart of the success of the IUPAC Thermodynamic Tables Project Centre for many years. The spirit of cooperation fostered by the Centre has led directly to initiatives in experimental work on the thermodynamic properties of fluids and to the widespread acceptance of its products as the 'state-of-the-art' with respect to thermodynamic tables. This international cooperation under the auspices of IUPAC will be continued and strengthened and it is to this end that the activities of the international liaison representatives will be directed. In addition, members of the Centre participate actively in international conferences, visit research laboratories and correspond on a regular basis with workers in other countries. There is a particularly close collaboration between the Centre and the International Association for the Properties of Steam (IAPS).

IUPAC Thermodynamic Tables Project Centre

The IUPAC Thermodynamic Tables Project Centre was inaugurated in 1963 with the object of compiling internationally agreed values of the equilibrium thermodynamic properties of liquids and gases. The range of thermodynamic states to be covered is that for which there exists reliable experimental data, and the agreed values are issued as tables. The sets of tables are completed by a description of the experimental methods, and assessment of accuracy and comparisons of the tables with the experimental data. For each fluid, except argon and ethylene (which are under revision), the equation of state which is given represents the available, reliable data to within their experimental accuracy.

The construction of the equation of state is performed by the Project Centre itself or by institutes cooperating in the IUPAC Project, but in all cases the books and tables embodying this work are produced by the Project Centre.

The tables give the volume, entropy, enthalpy, isobaric heat capacity, compression factor, fugacity/pressure ratio, Joule-Thomson coefficient, ratio of

the heat capacities and speed of sound as functions of pressure and temperature; and the pressure, entropy, internal energy and isochoric heat capacity as functions of density and temperature, all for both gaseous and liquid states. Zero pressure tables are given together with tables of saturation properties. Melting properties are given if the data are available.

There are a considerable number of important fluids for which there are insufficient reliable experimental data to form extensive tables using the above criteria. It has therefore been decided to relax these conditions somewhat and to produce sets of tentative tables for such fluids using a combination of experimental and estimated data. The first of these is for chlorine.

The IUPAC Subcommittee on Thermodynamic Tables, which reports to the IUPAC Commission on Thermodynamics, is responsible for policy and for ensuring that the final products of the Project and of the Centre are of a suitable standard to receive the imprimatur of IUPAC.

Theoretical developments

Work is carried out on a continuous basis to improve the equations of state which are used, the methods of correlation, the statistical weighting of the data and the fitting procedures. Various methods of prediction are under investigation in order to select and develop the most accurate and wide-ranging techniques.

Previous financial support

Organizations which have contributed to the Centre include the Academy of Sciences of the USSR, Air Liquide, BOC Ltd., ICI Ltd., Shell Research Ltd., BP Trading Ltd., the National Science Foundation of the USA, The Volkswagen Stiftung of the FRG, the Centre National de la Recherche Scientifique of France, the Swedish Technical Research Council and Sulzer Bros. Ltd.

IUPAC Transport Properties Project Centre

The IUPAC Subcommittee on Transport Properties was formed in 1981 under the chairmanship of Prof J. Kestin, and the Project Centre itself established in July 1983 with the object of preparing internationally agreed values for the transport properties of fluids and their mixtures. The Subcommittee consists of a group of internationally recognized experts in these fields, and individual members undertake the preparation of a correlation of the transport properties of a single fluid or group of fluids. The final correlations and tables, following approval by the Subcommittee, are published in established scientific journals. Thus, in common with the Subcommittee on Thermodynamic Tables, international assessment of the quality of the data is assured.

Many members of the Subcommittee are active participants in the scientific work of the Project

Centre, and contribute new experimental measurements as well as preparing accurate correlations.

Publications

- Angus, S. and Armstrong, B., 1972. *International Thermodynamic Tables of the Fluid State — I, Argon*. Butterworths, London.
- Angus, S., Armstrong, B. and de Reuck, K.M., 1974. *International Thermodynamic Tables of the Fluid State — 2, Ethylene*. Butterworths, London.
- Angus, S., Armstrong, B. and de Reuck, K.M., 1976. *International Thermodynamic Tables of the Fluid State — 3, Carbon Dioxide*. Pergamon, Oxford.
- Angus, S., de Reuck, K.M. and McCarty, R.D., 1977. *International Thermodynamic Tables of the Fluid State — 4, Helium*. Pergamon, Oxford.
- Angus, S., Armstrong, B. and de Reuck, K.M., 1978. *International Thermodynamic Tables of the Fluid State — 5, Methane*. Pergamon, Oxford.
- Angus, S., de Reuck, K.M., Armstrong, B., Stewart, R.B. and Jacobsen, R.T., 1979. *International Thermodynamic Tables of the Fluid State — 6, Nitrogen*. Pergamon, Oxford.
- Angus, S., Armstrong, B. and de Reuck, K.M., 1980. *International Thermodynamic Tables of the Fluid State — 7, Propylene (Propene)*. Pergamon, Oxford.
- Angus, S., Armstrong, B. and de Reuck, K.M., 1985. *International Thermodynamic Tables of the Fluid State — 8, Chlorine*. In press.
- Angus, S., 1975. A Survey of Methods of Measurement of

- Equilibrium Thermodynamic Properties. *Proc. 8th Int. Conf. on the Properties of Water and Steam*, 1974. Editions Européennes Thermiques et Industries, Paris.
- Angus, S., 1977. The Coordination of Data Programmes: The IUPAC Thermodynamic Tables Project. *Proc. 5th Biennial Int. CODATA Conf.*, 1976. Pergamon, Oxford.
- de Reuck, K.M. and Armstrong, B., 1979. A method of correlation using a search procedure, based on a step-wise least-squares technique, and its application to an equation of state for propylene. *Cryogenics* **19**, 505–512.
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Translations

- Bender, E., 1973. The Calculation of Phase Equilibria from a Thermal Equation of State — Applied to the Pure Fluids Argon, Nitrogen, Oxygen and their Mixtures. Verlag C. F. Mueller, Karlsruhe.
- Wagner, W., 1977. A New Correlation Method for Thermodynamic Data Applied to the Vapour Pressure Curve of Argon, Nitrogen and Water. Report PC/T15, IUPAC TTPC, London.
- Pollak, R., 1976. The Thermodynamic Properties of Water up to 1200 K and 3000 bar. Report PC/T CEGB 14, IUPAC TTPC, London.

Harmonization of Collaborative Analytical Studies

The Second Symposium on Harmonization of Collaborative Analytical Studies was held at the National Academy of Sciences, Washington, DC, USA, 25–27 October 1984, under the auspices of the International Union of Pure and Applied Chemistry (IUPAC), the Association of Official Analytical Chemists (AOAC) and the United States National Committee for IUPAC, on the occasion of the Centennial Anniversary of the founding of the AOAC. The Symposium was dedicated to the memory of Dr Harold Egan. Eighty-seven persons attended, representing fifteen countries, to listen to seven main lectures and twelve shorter communications.

It was decided that all participants would be asked to indicate, by means of a questionnaire, their reaction to the Symposium and the willingness of their organizations to continue the effort towards further harmonization of protocols for the design, conduct and interpretation of collaborative analytical studies. Subsequently, if

there is sufficient demand, a manual will be prepared from existing documents to be supplemented by instructions for the maintenance of statistical control. It was also emphasized that there is an urgent need for a comprehensive range of reference standards. It is anticipated that the whole proceedings will be published in the journal of the AOAC and that a permanent working group will be formed, consisting of representatives from the major organizations interested in conducting and participating in collaborative analytical studies, with terms of reference to include the maintenance of harmonization and the organization of the next meeting, to be devoted to the development of instructions, coordination, decisions and conclusions, in three years' time.

Further information can be obtained from Dr L. E. Coles, Secretary of the Applied Chemistry Division.

L. E. Coles

IUPAC International Symposium on the Physical Chemistry of Colloid and Macromolecules

The 'Svedberg Symposium' was held at Uppsala University, Sweden, 22–24 August 1984, to celebrate the 100th anniversary of Svedberg's birth. A brief account of Svedberg's career and achievements was given in *CI*, 1984, No. 2, pp. 15–16.

The great importance of Svedberg's pioneering research on colloids and macromolecules was pointed out at the Symposium by the Honorary President, Prof Herman F. Mark, Brooklyn, NY, in his introductory lecture. Svedberg's ultracentrifugal studies of proteins in aqueous solution were the best experimental proof of the existence of macromolecules, postulated in 1920 by Herman Staudinger. Retrospective lectures of Svedberg's contributions were given by five Swedish specialists: Per Stenius on *Colloids and surface sciences*, Kai O. Pedersen on *Proteins*, Ingvar Jullander on *Poly-saccharides*, Per-Olof Kinell on *Synthetic polymers* and Börje Larsson on *Radiation and isotope applications*. A vivid account of Svedberg's activity as a visiting professor at the University of Wisconsin in 1923–24 was given by Svedberg's graduate student at that time, Dr J. Burton Nichols (now retired from du Pont Experimental Station) in his lecture *The first Svedberg centrifuges*.

The sessions on Colloid and Surface Science presented recent advances and current research on *Surface enhanced raman scattering* of colloidal particles (Milton Kerker, USA), *Colloidal behaviour of surfactant systems: Micelles,*

microemulsions and liquid crystals (Björn Lindman and Hakan Wennerström, Sweden), *Separation of cells and other particles by centrifugation in colloidal silica solutions* (Torvard C. Laurent, Sweden). Ultracentrifugal sedimentation of macromolecules has been developed into a sophisticated research method as described at the Symposium in three main lectures: *An overview of experimental techniques and theoretical developments* (Lars-Olof Sundelöf, Sweden), *Sedimentation and interaction of macromolecules in solution* (A. J. Staverman, The Netherlands) and *Sedimentation analysis of proteins* (H. Suzuki, Japan).



Prof K. O. Pedersen lecturing on Svedberg's work on proteins.



Prof H. F. Mark delivering his opening address at the Symposium.

Macromolecular solutions and gels are now studied using a variety of advanced methods, presented at the Symposium in main lectures on *Salting-out absorption* (J. Porath, Sweden) to analyse protein and other solutions, *Analysis of biopolymers by high-performance electrophoresis* (S. Hjerten), *Light scattering measurements of macromolecules in solution* (H. Benoit, France) and *Macromolecular gels* (P. Flodin, Sweden) as separation media and carriers of functional groups in research and applications.

The main themes of the Symposium were further treated in 25 oral contributions and 15 posters, mainly describing the properties of macromolecular solutions, separation methods, gel formation, surface adsorption and crystallization of natural and synthetic polymers.

Svedberg was also a prominent botanist with an extensive knowledge of Scandinavian and Arctic flora. He studied plants in nature all his life and collected all the Scandinavian species for his herbarium. It contains over 11,000 sheets

and is now part of the collection of the Department of Plant Ecology, Uppsala University. Svedberg was an expert photographer, especially of plants, and a prominent artist who painted landscapes and scenes from many parts of the world. All these 'extracurricular' activities were illustrated at the Uppsala University Library in an exhibition of Svedberg's life, which was opened during the Symposium and will later be shown in other locations.

The Symposium was attended by about 260 participants of whom over 100 were scientists from 17 foreign countries. To promote interest in research among young people, a group of 40 high school students were invited to attend the Symposium. Each of the students was selected by the teachers as the best chemistry student of his gymnasium (high school). These young students attended the invited main lectures but were given their own special programme of posters, discussions with scientists and visits to the Chemistry and Physics Departments of Uppsala University. The initiative of inviting high school students was also very much appreciated among the participating scientists at the Symposium.

B. Rånby



Prof M. Mandel presenting greetings from IUPAC.



Prof. B. Rånby, Symposium President, and Mrs M. Svedberg in front of the bust of The Svedberg.
(Photo: UNTBILD, Uppsala.)

DRAFT INTERNATIONAL CODE OF CONDUCT ON THE DISTRIBUTION AND USE OF PESTICIDES

The draft Code of Conduct has been issued for comment by the Food and Agriculture Organization of the United Nations. It contains 12 Articles —

1. Objectives of the Code,
2. Definitions,
3. Pesticide management,
4. Testing of pesticides,
5. Reducing health hazards,
6. Regulatory and technical requirements,
7. Restrictions on availability and use,
8. Trade,
9. Information exchange,
10. Labelling, packaging, storage and disposal,
11. Advertising,
12. Implementation and monitoring of the Code —

and an Annex of explanatory notes. It is not a short or simple document mainly because the nature, properties, uses and effects of pesticides are diverse and therefore require comprehensive consideration. It is also designed to provide basic guidance so as to avoid uninformed, or misinformed, prejudice against some effective and much needed pesticides.

A number of countries and organizations have expressed concern about the propriety of supplying pesticides to countries which do not have infrastructures to register pesticides and to ensure their safe and effective use. There has also been concern over the possibility that residues of pesticides, not needed or not permitted in some countries, are present in imported agricultural commodities produced in countries where such regulatory procedures do not exist. Much thought has been given to the desirability of regulating pesticide exports from producing countries. While no company should trade in pesticides without a proper and thorough evaluation of the pesticide, including any risks, the fact that a product is not registered in an exporting country is not necessarily a valid reason for that country to refuse to allow exports of the pesticide. Developing countries, most of which are situated in tropical and semi-tropical regions, experience pest, disease and weed problems which have no equivalent in temperate countries that develop and produce pesticides. The climatic, ecological, agronomic, social, economic and environmental conditions

are different from those prevailing in countries from which pesticides are exported. The government of the exporting country is, therefore, not in a position to judge the suitability, efficacy, safety or fate of the pesticide under the conditions of use in the country where it will ultimately be sold. Such a judgement must, therefore, be made by the industry in the light of the scientific evaluation it has made and a detailed knowledge of the conditions prevailing in the country of proposed use.

The export to developing countries of pesticides which have been banned in one or more other countries or whose use has been severely restricted in some industrialized countries has been a subject of discussions on whether the exporting country can assume responsibility for the marketing and use of such products in the importing country. In this respect it is essential to note that when pesticides are banned it is generally for toxicology, environmental or political reasons. Valid and adequate toxicological reasons justifying banning a product are of concern, though not necessarily of equal importance, to most countries. Consequently, such products should not be exported or imported without careful consideration of the toxicological implications for those likely to be exposed.

Whilst this Code of Conduct may not solve all problems, nevertheless it should go a long way towards defining and clarifying the responsibilities of the various parties involved in the development, distribution and use of pesticides, and should be of particular value in countries which do not yet have control procedures. Article 1 puts these aims in formal language —

'1.1 This Code is to establish international standards of conduct for Governments in the exercise of their jurisdiction over public and private enterprises engaged in the manufacture, trade and use of pesticides of all types and for all purposes everywhere.

1.2 These standards of conduct are aimed at:

1.2.1 ensuring that pesticides are used effectively for the improvement of agricultural production and of human, animal and plant health while reducing to the maximum extent possible any hazard to humans and the environment;

1.2.2 alleviating problems which might result from the import of certain types of pesti-

cides into countries which have not yet established adequate controls over their use;

1.2.3 promoting practices which encourage the safe and efficient use of pesticides including the prevention of accidental poisoning from their improper handling.

1.3 The Code is specifically addressed to governments and through them to manufacturers, commercial enterprises, institutions, workers

unions and persons responsible for any aspect of trade and use of pesticides.'

Mr J. A. R. Bates (Chairman of Commission VI.5), *inter alia*, has been very much concerned with the drafting of the Code and will, no doubt, be very willing to keep anybody interested informed of its progress towards international adoption.

Other People's Publications

Association of Official Analytical Chemists (AOAC)

Official Methods of Analysis of the AOAC, 14th Edition.

This 1100-page volume contains over 1700 analytical methods including, for each method adopted since the 13th Edition, within-laboratory and between-laboratory standard deviations. Other features are easy-to-locate references, chemical and common names of all drugs and pesticides, a greatly expanded index, and the first AOAC official method in veterinary analytical toxicology, an expanding area of interest to AOAC.

The book's easy-to-follow, step-by-step format specifies all reagents and apparatus to be used in each method; alternative methods are often provided to accommodate a wide range of laboratory capabilities. Annual updates are included in the purchase price of US\$148.50 for non-members in the USA, US\$151.50 outside the USA. ISBN 0-935584-24-2.

European Federation of Biotechnology (EFB)

EFB Newsletter No. 7, September 1984. Excerpts from the reports of the Federation's Working Parties — Applied Molecular Genetics, Bioreactor Performance, Downstream Processing and Recovery of Bioproducts, Education in Biotechnology, Environmental Biotechnology, Immobilized Biocatalysts, Animal and Plant Cell Culture Technology (formerly Mass Cell Culture Technology) and Safety in Biotechnology. Calendar of events of interest to biotechnologists.

Biology International No. 9, June 1984. Paper by P. Lavelle on *The soil system in the humid tropics*. Proposal by the United Nations University for the establishment of an Institute for Natural Resources in Africa (INRA). Calendar of meetings 1984-1987.

Biology International, Special Issue — 7. The State of Biology in the Arab States, a summary report of the papers and discussions at the symposium held in Baghdad, Iraq, 5-8 December 1983.

International Council for Scientific Unions (ICSU)

ICSU Newsletter No. 19, October 1984. Report of the 20th ICSU General Assembly (see CI, 1984, No. 6, pp. 38-41), including Resolutions and Decisions, Report of the Assembly Finance Committee, Decisions of the 41st and 42nd Meetings of the Executive Board. Brief reports on the three scientific symposia.

ICSU Press Newsletter No. 2, October 1984. Publications in print; publications in preparation; publishing partners; research projects; ICSU Press Board Members.

ICSU Committee on Data for Science and Technology (CODATA)

CODATA Newsletter No. 30, October 1984. Resolutions and decisions of the CODATA General Assembly and a report of that meeting. Announcement of Phase Equilibrium Workshop/Symposia, September 1985. New CODATA publications and list of other recent data publications.

World Health Organization (WHO)

WHO Expert Committee on Specifications for Pharmaceutical Preparations: 29th Report

This report is No. 704 in the World Health Organization Technical Report Series. It contains proposals for the setting up, staffing and equipping of model laboratories — a first-stage laboratory for drug surveillance and a medium-size drug control laboratory. Another section details the progress being made with the *International Pharmacopoeia*, with guidelines for those willing to collaborate in the preparation of, or comment on, monographs for inclusion in it. Lists of basic tests, international chemical reference substances and of infrared reference spectra for certain pharmaceutical substances are given.

The 54-page booklet is available from WHO

Regional Offices or the WHO Distribution and Sales Services, 1211 Geneva 27, Switzerland, price 6 Sw.fr. ISBN 92-4-120704-3.

International Union of Biochemistry (IUB)

Biochemical Education, Vol. 12, No. 4, October 1984. The editorial discusses the use of glass and plastics apparatus. Article on *Microcomputers and other educational hardware*.

International Union of Pure and Applied Physics (IUPAP)

IUPAP News Bulletin 84-4, 15 October 1984. List of IUPAP-sponsored Conferences, with names and addresses of organizers, for 1985 and 1986.

Networking in Terminology

The 2nd Infoterm Symposium with the above title will be held in Vienna, Austria, 14-17 April 1985. Six sessions are planned, with the titles:

- Fundamentals and tools for networking in terminology.
- Networking in energy terminology — practical aspects and applications.
- Terminology as a prerequisite of knowledge/technology transfer — Networking in terminology facilitating, e.g. this interactive process.
- Computer-aids for networking in terminology — computer-assisted terminology work.
- International networking in terminology — future perspectives and priorities.
- Scientific foundation of terminology work — terminology science and related fields contributing to networking in terminology.

During the Symposium a demonstration of terminological data banks will be organized.

The Symposium will be followed by 1st TermNet Assembly (restricted to present or prospective TermNet partners), 17-18 April and 1st International Workshop on Terminology Documentation, 18-19 April, both also in Vienna.

If you have never heard of Infoterm or TermNet, read on. Infoterm is the International Information

Centre for Terminology, an organization affiliated to Österreichisches Normungsinstitut, the Austrian Standards Institute. Its function is to run a worldwide network for the coordination of terminology work — TermNet, the International Network for Terminology — with the declared aim of encouraging:

- Scientific and methodological research for terminology work;
- The application of unified principles and methods in terminology work;
- Terminological research;
- The preparation of terminologies and their recording in machine-readable form;
- The collection, recording and storing of terminological data;
- The collection, recording, analysis and storing of information on terminology (e.g. bibliographic and factographic databases);
- The dissemination of information on terminology (e.g. bibliographies).

As an example of this last effort, Infoterm has issued a compilation, *International Bibliography of Computer-assisted Terminology*, by Magdalena Krommer-Benz, containing 325 bibliographical references with an English translation of titles where appropriate.

Technology in the 1990s: Agriculture and Food

A discussion meeting with the above title was held at the Royal Society, London, UK, in October 1984. This was attended on behalf of IUPAC by Dr L. E. Coles, Secretary of Division VI.

The programme included the following lectures: *Land resources in agriculture* (P. Buringh, Netherlands); *Water resources in agriculture* (G. Stanhill, Israel); *Crop nutrients: input and efficiency of use* (P. B. Tinker, UK); *Crop improvement: breeding and genetic engineering* (P. R. Day, UK); *The role of the chemical industry in improving the effectiveness of agriculture* (C. H. Reece, UK); *Knowledge for animal breeding* (R. B. Land, UK); *Infectious animal disease and its control* (P. M. Biggs, UK); *Animal husbandry* (P. N. Wilson, UK). There were also seven contributions in biotechnology — *Plant*

cell biotechnology and agriculture: impacts and perspectives (M. W. Fowler, UK); *The microbial upgrading of straw for agricultural use* (J. M. Lynch, UK); *Enzyme catalyzed modification of oil and fats* (A. R. Macrae, UK); *Production of behaviour-controlling chemicals by crop plants* (J. A. Pickett, UK); *The newer vaccines* (F. Brown, UK); *Genetic manipulation of animals* (E. J. C. Polge, UK); *Production of feed protein from animal waste by earthworms* (C. A. Edwards, UK).

Interested readers are invited to write to Dr Coles (Mid-Glamorgan Public Health Laboratory, The Parade, Cardiff CF2 3UJ, UK) or The Royal Society (6, Carlton House Terrace, London, SW1Y 5AG, UK) for further information.

IUPAC CONFERENCES

Additional information from address in parentheses

1985

Polymer Analysis

February 11–14. POLYMER 85: Characterization and Analysis of Polymers. Melbourne, Australia. (Dr J. H. O'Donnell, Polymer & Radiation Group, Department of Chemistry, University of Queensland, Brisbane 4067, Australia.)

Hydrogen in Metals

March 26–29. 5th International Symposium on Hydrogen in Metals. Belfast, UK. (Dr G. Svehla, Department of Chemistry, David Keir Building, Queen's University of Belfast, Stranmillis Road, Belfast, BT9 5AG, Northern Ireland, UK.)

Compounds of Transition Elements

April 9–13. 8th International Conference on Solid Compounds of Transition Elements. Vienna, Austria. (Gesellschaft Österreichischer Chemiker, VIII SCTE, Eschenbachgasse 9, A-1010 Wien, Austria.)

Analytical Chemistry

April 15–19. 2nd International Symposium on Analytical Chemistry in the Exploration, Mining and Processing of Materials. Pretoria, Republic of South Africa. (The Symposium Secretariat S.328, CSIR, Box 395, Pretoria 0001, Republic of South Africa.)

Non-crystalline Order in Polymers

May 27–30. International Symposium on Non-crystalline Order in Polymers. Naples, Italy. (Prof A. Sirigu, Dipartimento di Chimica, Università di Napoli, Via Mezzocannone 4, I-80134 Napoli, Italy.)

Non-crystalline Solids

June 3–6. International Conference on the Theory of the Structures of Non-crystalline Solids. Bloomfield Hills, Michigan, USA. (Dr Martin C. Steele, Director, Institute for Amorphous Studies, 1050 East Square Lake Road, Bloomfield Hills, Michigan 48013, USA.)

Surface and Colloid Science

June 24–28. 5th International Conference on Surface and Colloid Science. Potsdam, NY, USA. (Prof E. Matijević, Institute of Colloid & Surface Science, Clarkson University, Potsdam, NY 13676, USA.)

Bioorganic Chemistry

June — . 1st International Symposium on Bioorganic Chemistry. New York City, NY, USA. (Prof E. T. Kaiser, Department of Chemistry, Rockefeller University, New York, NY 10021, USA.)

Plasma Chemistry

July 1–5. 7th International Symposium on Plasma Chemistry. Eindhoven, Netherlands.
(Dr C. J. Timmermans, Department of Physics, Technische Hogeschool Eindhoven, PO Box 513, 5600 MB Eindhoven, The Netherlands.)

Polymer Composites

July 8–11. 28th Microsymposium on Macromolecules: Polymer Composites. Prague, Czechoslovakia.
(Dr P. Čefelín, Scientific Secretary, PMM Secretariat, Institute of Macromolecular Chemistry, Czechoslovakia Academy of Sciences, 1888 Petriny, Prague 6, Czechoslovakia.)

Organometallic Chemistry

July 12–15. 3rd International Symposium on Organometallic Chemistry directed toward Organic Synthesis. Kyoto, Japan.
(Prof R. Noyori, Department of Chemistry, Nagoya University (Rigaku–Bu), Nagoya 464, Japan.)

Aromatic Compounds

July 15–19. 5th International Symposium on Novel Aromatic Compounds. St Andrews, UK.
(Dr P. J. Garratt, Department of Chemistry, University College London, 20 Gordon Street, London WC1H 0AJ, UK.)

Interactions in Solution

July 15–19. 7th International Symposium on Solute–Solute–Solvent Interactions. Reading, UK.
(Dr T. M. Hardman, Department of Chemistry, The University of Reading, Whiteknights, Reading, Berkshire, RG6 2AD, UK.)

Mycotoxins and Phycotoxins

July 22–25. 6th International Symposium on Mycotoxins and Phycotoxins. Pretoria, Republic of South Africa.
(Miss Jill Sawers, CSIR Symposium Secretariat S351, Council for Scientific and Industrial Research, POB 395, Pretoria 0001, Republic of South Africa.)

Heterocyclic Chemistry

August 11–16. 10th International Congress of Heterocyclic Chemistry. Waterloo, Ontario, Canada.
(Ms. Margaret Gerth, The Guelph–Waterloo Centre for Graduate Work in Chemistry, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.)

Hydrothermal Reactions

August 12–14. 2nd International Symposium on Hydrothermal Reactions. University Park, Pennsylvania, USA.
(Prof H. L. Barnes, Prof of Geochemistry and Director of Ore Deposits, College of Earth and Mineral Sciences, The Pennsylvania State University, 235 Deike Building, University Park, Pennsylvania 16802, USA.)

Cationic Polymerization

August 12–15. 7th International Symposium on Cationic Polymerization and Related Processes. Jena, German Democratic Republic.
(Dr R. H. Wondraczek, Sektion Chemie, Friedrich–Schiller–Universität, DDR-6900 Jena, German Democratic Republic.)

Macromolecules

August 18–23. 30th International Symposium on Macromolecules. The Hague, The Netherlands.
(Dr J. A. M. Smit, Gorlaeus Laboratories, University of Leiden, Department of Chemistry, PO Box 9502, 2300 RA Leiden, The Netherlands.)

Thermal Analysis

August 19–23. 8th International Conference on Thermal Analysis. Bratislava, Czechoslovakia.
(Dr O. Korab, The Organizing Committee of the 8th ICTA, c/o Slovak Technical University, Post Box, 880 37 Bratislava, Czechoslovakia.)

Chemical Education

August 23–28. 8th International Conference on Chemical Education: Widening the Scope of Chemistry. Tokyo, Japan.
(Prof M. Oki, Department of Chemistry, Faculty of Science, The University of Tokyo, Tokyo, 113 Japan.)

Mathematics and Chemistry

September 2–5. International Symposium on Applications of Mathematical Concepts to Chemistry. Dubrovnik, Croatia, Yugoslavia.
(Prof Lj. Rusčić, Ruder Bosković Institute, PO Box 1016, Bijenicka 54, YU-41001 Zagreb, Croatia, Yugoslavia.)

Marine Natural Products

September 2–6. 5th International Symposium on Marine Natural Products. Paris, France.
(Dr A. Ahond, Institut de Chimie des Substances Naturelles, CNRS, F-91190 Gif sur Yvette, France.)

Vapour–Liquid Equilibrium

September 5–7. 2nd International Workshop on Vapour–Liquid Equilibrium in 1-Alkanol + n-Alkane Mixtures. Paris, France.

(Dr H. V. Kehiaian, Laboratoire de Chimie Organique Physique, Institut de Topologie et de Dynamique des Systèmes, Université Paris VII, 1 rue de la Brosse, F-75005 Paris, France.)

Organometallic Chemistry

September 8–13. 12th International Conference on Organometallic Chemistry. Vienna, Austria.

(Prof K. Schlögl, Institut für Organische Chemie der Universität Wien, Währingerstrasse 38, A-1090 Wien, Austria.)

Mass Spectrometry

September 8–13. 10th International Symposium on Mass Spectrometry. Swansea, UK.

(Dr F. M. Harris, Royal Society Research Unit, University College of Swansea, Swansea SA2 8PP, UK.)

IUPAC Congress

September 9–13. 30th International Congress of Pure and Applied Chemistry. Manchester, UK.

(The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Spectroscopy

September 15–21. 24th Colloquium Spectroscopicum Internationale (CSI XXIV). Garmisch–

Partenkirchen, Federal Republic of Germany.

(Dr J. Wendenburg, Gesellschaft Deutscher Chemiker, Carl Bosch-Haus, Postfach 900440, Varrentrappstrasse 40–42, D–6000 Frankfurt/Main 90, Federal Republic of Germany.)

Chemical Resources of the Ocean

September 22–28. Chemical Resources of the Global Oceans — CHEMRAWN IV. Massachusetts, USA.

(J. R. Moore, Director, Marine Science Institute, University of Texas, Austin, TX 78712, USA.)

Medicinal Natural Products

November 10–13. International Symposium on Organic Chemistry of Medicinal Natural Products. Shanghai, China.

(Prof Dai Lixin, Shanghai Institute of Organic Chemistry, Academia Sinica, 345 Lingling Lu, Shanghai, China.)

1986

Analytical Chemistry

July 20–26. SAC 86: International Conference on Analytical Chemistry. Bristol, UK.

(Prof J. M. Ottaway, Department of Pure and Applied Chemistry, University of Strathclyde, Thomas Graham Building, 295 Cathedral Street, Glasgow G1 1XL, UK.)

Pesticide Chemistry

August 10–17. 6th International Pesticide Chemistry Congress. Ottawa, Canada.

(Dr H. V. Morley, London Research Station, Agriculture Canada, University Sub-Post Office, London, Ontario, Canada.)

Natural Products

August 17–23. 15th International Symposium on the Chemistry of Natural Products. The Hague, The Netherlands.

(Prof U. K. Pandit, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, The Netherlands.)

Physical Organic Chemistry

August 24–29. 8th IUPAC Conference on Physical Organic Chemistry. Tokyo, Japan.

(Prof M. Oki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

REVISIONS TO IUPAC HANDBOOK

CI, 1984 Supplement

Additions and amendments to the *Handbook* between 9 October 1984 and 27 November 1984 are given below.

Additions, new entries, are marked with an asterisk. The affiliation of new members of IUPAC bodies is included.

Amendments are shown by # at the beginning of the line in which the revision occurs.

MEMBERSHIP LISTS OF IUPAC BODIES

OBSERVER COUNTRIES

Ethiopia Chemical Society of Ethiopia, PO Box 32934, Addis Ababa,
Ethiopia
#(TEL: +251 (1) 11 31 77)

ASSOCIATED ORGANIZATIONS

International Committee for #Mr. C. J. V. ROBERTS (Secretary ICSP),
Science of Photography #Research Division, Kodak Ltd., Headstone Drive,
 #Harrow, Middlesex HA1 4TY, UK
 #(TEL: +44 (1) 427 4380. TELEX: 21925 G)

International Congress of #Dr. Y. AMENOMIYA (Secretary ICC),
Catalysis #Division of Chemistry, National Research Council of Canada,
 #Ottawa, Ontario K1A 0R9, Canada

CHEMRAWN COMMITTEE (Established 1976)

Members

#Dr. A. Hayes (1985-1989)
#Prof. J. Klein (1985-1989)

Associate Members

#Prof. C. G. Overberger (1985)

INTERDIVISIONAL COMMITTEE ON NOMENCLATURE AND SYMBOLS (IDCNS) (Established in its present form 1975)

#Dr. K. L. Loening (1976-1987)
Chairman

*International Union of Crystallography

*Dr. S. C. Abrahams

COMMISSION ON POLYMER CHARACTERIZATION AND PROPERTIES (IV.2) (Established 1973)

WORKING PARTY ON STRUCTURE AND
PROPERTIES OF COMMERCIAL POLYMERS

*EASTERN EUROPEAN SUB-GROUP

*Dr. J. Stejskal
Chairman

*Members

*Dr. J. Kučera
*Dr. F. A. Shutov
*Dr. P. Szewczyk

*Titular Members

- *Dr. J. C. White (1983-1987)
Chairman
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Deletions:

Prof. J. H. Block (resigned) [p. 6, Secretary ICC]

Mr. G. Christensen (deceased) [p. 25, Working Party on Supported Polymer Films]

Ir. R. Mormont (resigned) [p. 10, COCI]

Prof. H. Pietsch (resigned) [p. 6, Secretary ICSP]

Dr. K. Takeda (resigned) [p. 10, COCI]

Mr. A. R. H. Tawn (resigned) [p. 25, Working Party on Supported Polymer Films]

Prof. Zaikov (term of service completed) [p. 10, CHEMRAWN Committee]

Pure and Applied Chemistry

Official Journal of the International Union of Pure and Applied Chemistry

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- to publish the recommendations of the Union's commissions on nomenclature, symbols and units;
- to publish technical reports on standardization, recommended procedures, collaborative studies, data compilations, etc.;
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The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary, non-governmental, non-profit association of organizations, each of which represents the chemists of a member country. Its objectives are:

to promote continuing co-operation among the chemists of the member countries;

to study topics of international importance to pure and applied chemistry which need regulation, standardization, or codification;

to co-operate with other international organizations which deal with topics of a chemical nature;

to contribute to the advancement of pure and applied chemistry in all its aspects.

The membership of IUPAC presently comprises 45 countries, each represented by a national organization, such as an academy of science or research council.

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The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)



1985, Vol. 7, No. 2 (April)

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The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)

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REPRODUCTION OF ARTICLES

Reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original publication in *Chemistry International*, unless there is a footnote to the contrary.

Front cover: University Main Building, Jena, venue of the 7th International
Symposium on Cationic Polymerization and Related Processes.

This is very much an IUPAC issue. For reasons I will not dwell on, the mixture of business and general interest that we have managed to achieve recently is lacking, but I hope that the variety of IUPAC items is sufficient to maintain your interest.

Many of those who replied to a questionnaire on what should, or should not, go in *CI* expressed the view that background information on the people in the Union would help to bring it to life. Hence the attempt to put faces to names whenever possible and the pen pictures of prominent persons. It was gratifying therefore to receive a copy of Prof van Beylen's talk about Prof Smets (former IUPAC President) given at the Polymer Chemistry Meeting in Leuven. We have another brief biography of a Division President, this time Dr Good of the Inorganic Chemistry Division. Also, as I promised last time, an introduction to your new Editor — although editing *CI* is only one part of Dr Freemantle's duties, when he is wearing his Information Officer hat. Having mentioned information, it is pertinent to point out the various forms of IUPAC information occurring in this issue. There are: summaries of three books, two Commission reports and two provisional recommendations; the 1985 JCBN Newsletter; the contents of the first three issues of *PAC* 1985; and a short article on even further relaxation of the rules for republication of IUPAC material — which should please a number of our Commission members.

The conference season approaches so there is a larger number of pages devoted to IUPAC-sponsored meetings than recently. The coverage is very varied, depending on what has been made available in time to meet the schedule for this issue, but perhaps this variation will persuade our readers to go on reading. Variability in length is also the name of the game in the summary minutes of Committee/Commission meetings — but far be it from me to voice any opinions on the merits or demerits of long or short submissions. I must be, and appear to be, completely impartial. I do not often get reports on conferences and symposia so that it makes a change to be able to include one — on the problems of nomenclature.

I mentioned last time that Revisions to the *IUPAC Handbook* was a growing section of *CI*. And so it goes on, this time with 11½ pages. Of perhaps more immediate interest to some of those attending the Lyon General Assembly are the amendments to the timetable of meetings. Nobody can accuse IUPAC of being static!

The IUPAC Information Officer/Affiliate Affairs Secretary

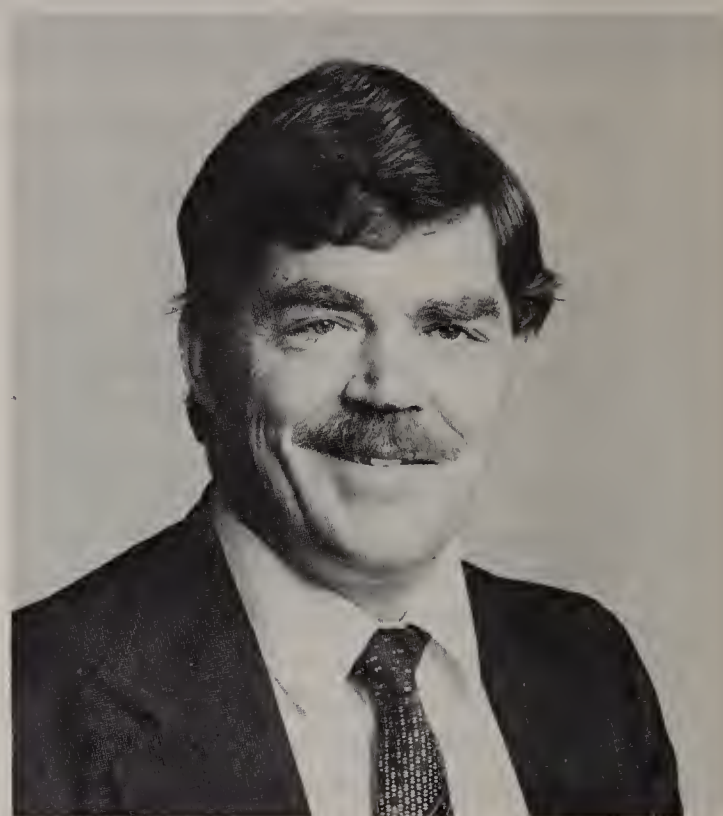
Readers of the Secretary General's Column in the October and December 1984 issues of *C/* (all of you, I hope) will have noted the most recent efforts to secure sufficient funds to enable the Affiliate Membership Scheme, approved in principle by Council in Lyngby, to be launched and, linked to this, the appointment of an Information Officer/Affiliate Affairs Secretary. The result of the recruitment mentioned by the Secretary General was, as announced in *C/*, 1985, No. 1, p. 2, the selection (out of a total of over 60 applicants) and appointment of Dr M. H. Freemantle. This announcement was necessarily brief as it had to be squeezed into the publication schedule at rather later than the last minute. Now that we have a bit more time and space it seems appropriate to spend some of each on a fuller account of the job and the man.

As can be seen from the title, the job has two distinct aspects. The Information Officer (IO) part naturally includes acting as editor of *C/* but more besides. It is hoped to establish and service a regular 'IUPAC column' in national chemistry news journals in which outlines of the more recent and forthcoming IUPAC activities will be presented; in addition, at General Assemblies, it will be the IO's job to set up, in conjunction with the local organizers, a 'press room' in order to promote coverage of IUPAC affairs by the local and national newspapers, radio and television. The IO will also take over some of the Secretariat's delegated responsibilities in connection with IUPAC-sponsored symposia: he will, on behalf of the President, identify and appoint a suitable IUPAC person as official Union representative to present greetings at the opening ceremony; he will also handle any requests for information about IUPAC-sponsored symposia.

The Affiliate Affairs Secretary (AAS*) has to develop his job from nothing. His first task will be to start consultations with NAOs in IUPAC member countries, and national chemical societies in non-member countries, to establish the mechanisms for recruitment of Affiliate Members in 1986 and from then on to liaise with those countries; the AAS will also have to do all the administrative work for persons wishing to become Affiliate Members in countries with no national chemical society.

There was a third item on the outline job description — 'Other relevant duties as may be assigned'. It might be amusing to speculate on what these other duties might be, whether in connection with information or affiliation.

*IDCNS, Commissions V.3 and V.4 please note an apparent conflict with other accepted terminology.



Dr Michael H. Freemantle.

So much for the job, now what about the man chosen to do it? Dr Michael H. Freemantle was born in Southampton, UK, in September 1942 and gained his BSc in Chemistry at Exeter University in 1964. Following research on carbohydrate chemistry he was awarded his PhD at London University (Birkbeck College) and then went to Oxford with an SRC postdoctoral research fellowship to study NMR spectroscopy. After two years in the organic fine chemicals industry (as chemist and plant manager at Ciba-Geigy Chemicals Ltd, Grimsby) he started his teaching career at the Polytechnic of the South Bank, London. In 1974 he moved, under contract to the UK Ministry of Overseas Development, to Amman to take the post of Associate Professor of Physical Chemistry at the University of Jordan. Here he first became involved with UNESCO's Division of Scientific Research and Higher Education, being an editorial consultant since 1975. In this capacity he has prepared reports and proceedings of meetings worldwide which have been well received, particularly by 'Third World' chemists for whom they were primarily intended. On completion of his contract in 1979, he returned to UK and became a chemistry teacher at Cranbourne School, Basingstoke.

Dr Freemantle has been writing all his working life: apart from his reporting for UNESCO he has had numerous articles, research papers and reviews published in various journals and his

first book, *The Chemist in Industry (3): Management and Economics*, was published in 1975. He was coeditor of *A Sourcebook of Chemical Experiments* (see *CI*, 1984, No. 4, p. 4) published by UNESCO (1975) and author of a school

chemistry text-book, *Essential Science: Chemistry* (1983).

Do you know, I can't help feeling that you are going to notice a difference when he takes over *CI*!

R. W. Fennell

Easier republication or translation of IUPAC reports

You may have noticed on p. 123 of your copy of the *IUPAC Handbook* the following:

The Union intends to introduce in 1985 a generous and simple policy for reproduction of material from its publications, especially with regard to reports on nomenclature/symbols and other technical matters published in *PAC* and material published in *CI*. Look out for this announcement in *PAC* and *CI* towards the end of 1984/early in 1985.

You may also have noticed when you read the January (No. 1) issue of *PAC*, Vol. 57 (1985) that there was a footnote on the title pages of the Commission reports in that issue, viz:

Republication of this report is permitted without the need for formal IUPAC permission on condition that an acknowledgement, with full reference together with IUPAC copyright symbol (©1985 IUPAC), is printed. Publication of a translation into another language is subject to the additional condition of prior approval from the relevant IUPAC National Adhering Organization.

The next (February, No. 2) issue of *PAC* will have the following announcement on the inside front cover:

Except for the section 'IUPAC Recommendations on Nomenclature and Symbols and Technical Reports from Commissions' requests for permission to reproduce material from the Journal should be addressed to the IUPAC Secretariat.

The effect of all this is that it is not now necessary to obtain IUPAC permission, nor to wait three months after publication in *PAC*, before a Commission or Committee report may be reproduced elsewhere or a translation of it issued. The only conditions are that the full reference and IUPAC copyright symbol must be printed with the acknowledgement and, for translations, that the approval of the relevant IUPAC National Adhering Organization is also indicated. This further relaxation to the former rules (referred to in *CI*, 1983, No. 4, p. 30 and 1984, No. 2, p. 1) for reproduction should go even further to aid dissemination of IUPAC-generated material — provided that the appropriate Commission members play their part and persuade the more specialized journals to publish it. Why the IUPAC copyright symbol as a condition for republication? Won't this dissuade some Editors from reproducing and hence restrict dissemination of IUPAC material? We sincerely hope not as the intention is just the reverse — to encourage further the reproduction of Commission reports, e.g. by photocopying, from whatever journal they may be found without having to obtain permission from anyone; the IUPAC copyright, which allows unrestricted reproduction, overrides any copyright restrictions of the journal as a whole.

As for *CI*, immediate reproduction or translation of articles has been encouraged, at least since the introduction, in *CI*, 1982, No. 1, of the paragraph inside the front cover:

Reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original publication in *Chemistry International*. Permission to reproduce articles will normally be granted at no cost to non-profit making bodies (such as National Adhering or Associated Organizations of IUPAC, National Chemical Societies, or International Scientific Unions). Permission for commercial publishers will normally be conditional upon publication of an advertisement for IUPAC publications. In all cases, please contact the IUPAC Secretariat for clearance.

As it stands this is now more restrictive than for Commission reports in *PAC* because permission is still required from the Union before reproduction may be undertaken. Clearly we do not want this situation to continue so, as you can see from the inside front cover of this issue, we have brought *CI* more into line with the conditions applied to Commission reports in *PAC*. Permission to reproduce *CI* material, with appropriate acknowledgement, is now completely unrestricted unless a specific statement to the contrary is made.

Symposium on International Solutions to Problems of Nomenclature

This symposium was held on 18 December 1984 in Honolulu at the International Chemical Congress of Pacific Basin Societies. Those attending heard speakers from Japan, Australia and the USA report on the work of IUPAC and other international organizations in standardizing chemical nomenclature. In his opening remarks Loening (Chairman, IDCNS) illustrated the great need for standardization and emphasized the role of IUPAC in trying to achieve it.

Kuchitsu (Chairman, Commission I.1) discussed the IUPAC Green Book and advances in the naming of physicochemical quantities and units. The apparent end of confusion in describing the subgroups of the Periodic Table was greeted with relief by Yamasaki (National Representative, Commission II.2), but he warned that the development of nomenclature for cluster compounds and organometallic compounds needs to be speeded up to match the rapid chemical progress in these areas.

Schoenfeld (Associate Member, Commission III.1) gave characteristically witty advice to those who feel IUPAC's Blue Book to be confusing or inadequate in the naming of complicated organic compounds. He praised the parallel advances of *Chemical Abstracts* in organic nomenclature and downplayed the difference between the two systems, which he considered increasingly unimportant as the compounds being named grow more complicated.

Tsuruta (Past Titular Member, Commission IV.1) surveyed IUPAC advances in polymer nomenclature and dwelt on the various types of stereochemistry found in them. Webb (Nomenclature Committee, IUB) reported on

biochemical nomenclature, emphasizing the nomenclature of enzymes. He explained the codification of enzymes according to substrate and specific catalytic activity and he welcomed the fruitful cooperation from biochemists worldwide.

Lehmann (Chairman, Commission VII.2), in reporting on the introduction of SI units into clinical chemistry, was of the opinion that medical personnel accustomed to comparing test results with well-established normal values should have little difficulty adjusting to the new (SI) figures. A short review of the nomenclature activities of the IUPAC Division of Analytical Chemistry by Guilbault (Associate Member, Commission V.3) was read in his absence by Loening.

Going beyond the work of the IUPAC nomenclature Commissions, Schiffman (US Adopted Names Council) and Donaldson (ANSI Committee on Pesticide Common Names) presented papers on non-proprietary names for pharmaceuticals and pesticides, respectively. They found common ground in their concern over the difficult problem of finding distinct but appropriately related common names for stereoisomers and stereoisomeric mixtures of individual chemicals.

Fernelius (Past Chairman, Commission II.2) was prevented from summing up the symposium as a result of a severe fall, but his ably prepared and thoughtful paper about the need for greater efforts to develop good nomenclature was read by Loening. It provided a fitting conclusion to this fine symposium.

Kurt L. Loening

16th International Symposium on Chromatography

The Symposium is being organized by the Groupement pour l'Avancement des Méthodes Spectroscopiques et physico-chimiques d'analyse (GAMS) in association with the Chromatographic Society (London) and the Arbeits Kreis Chromatographie der Fachgruppe Analytische Chemie der Gesellschaft Deutscher Chemiker (Frankfurt). It will be held at the Conservatoire National des Arts et Métiers, Paris, 21–26 September 1986. The pro-

gramme will consist of plenary lectures, oral presentations and poster sessions dealing with all aspects of chromatography and related techniques. Prospective authors should send one-page abstracts to GAMS by 15 December 1985; English, French or German may be used but English is preferred. Further information may be obtained from GAMS, 88 bd Malesherbes, F-75008 Paris, France.



From left to right: O. Schiffman, H. P. Lehmann, K. L. Loening.



From left to right: T. Tsuruta, R. Schoenfeld, E. Webb, K. Kuchitsu.

Nomenclature at Honolulu.

Polymer Chemistry Meeting

The meeting was held at the Katholieke Universiteit Leuven, 26–28 September 1984, in honour of Prof G. Smets on the occasion of his retirement. Many of you will remember Prof Smets from the time when he was IUPAC President — 1977–79.

We think it most appropriate at this time to reproduce a shortened version of the introductory talk given by Prof M. Van Beylen at the meeting:

After 40 years of a very productive career, Prof Georges Smets has reached the age of retirement. Few of those who had the privilege to know him as a teacher, as their thesis promoter, as a colleague, as a friend, will be able to imagine Polymer Chemistry, in Belgium and elsewhere in the polymer world, without Prof Smets. Indeed, Prof Smets was present at the early stages of polymer chemistry and, over the years, he not only enthusiastically shared his knowledge with his students, but also exported it all over the world. Although new governmental regulations force him to stop official teaching, hardly anyone can believe that this will be the end of his scientific output. Numerous people, of both the scientific and industrial worlds, still seek his advice, and very understandably so, because Prof Smets has made essential contributions to nearly all fields of macromolecular chemistry. Thus he was one of the first to show successfully the possibilities of block- and graft-copolymerization by radical chain transfer reaction between a growing chain and a pre-existing polymer. By incorporating peroxide groups into polymers or by putting them at their ends, several original methods of graft- and block-copolymerization by radical mechanisms were established years before anionic polymerization became the customary way to produce them. Later on, photochemical initiation procedures based on the photolysis of photosensitive side groups or groups built into the polymer chain, were also used.

Prof Smets' background in organic chemistry led him to his extensive studies of organic reactions on high polymers and intramolecular functional interactions, in the course of which he was one of the first to draw attention to the influence of intramolecular structure and stereospecificity of the polymers during reaction and on the nature of group interaction.

The same thorough knowledge of organic chemistry and its recent development were at the origin of Prof Smets' interest in the synthesis of new polymers using recent methods of organic chemistry such as cyclodimerization, dipolar cycloadditions, carbene and azide reactions either for the preparation of new monomers followed by their polymerization or for direct polyaddition reactions. Another of his



Prof G. Smets, former President of IUPAC, with Prof C. H. Bamford, President of the Macromolecular Division on his left. Prof C. Overberger, Bureau Member, looks over their shoulders.

many fields of interest was the synthesis and properties of photochromic polymers and copolymers. Incorporation of photochromic groups into a polymer molecule yielded deeper insight in the internal structure and the physical properties of polymers. He also observed photo-mechanical phenomena in the case of photochromic networks, which show photocontractile behaviour. These phenomena led him to study several photochemical and thermal reactions, e.g. isomerization, dissociation, and recombination in solid polymer matrices, stressing the importance of the physical properties of the polymer medium on the course of these reactions.

This is not an exhaustive survey, as Prof Smets also treated problems like anionic polymerization and copolymerization and the synthesis of polyampholites, their complexation behaviour towards metal salts and their significance for selective membrane synthesis.

Now 69, Prof Smets is still as inventive and enthusiastic as ever, the years not having diminished his incredible energy. He is still the first to arrive at the laboratory in the morning and the last to leave it at night and, though he is now officially retiring as a Professor at the University, it is hard to imagine him retiring from polymer chemistry.

M. Van Beylen

IUPAC–IUB Joint Commission on Biochemical Nomenclature (JCBN) Newsletter 1985

This is an edited and abridged version of the Newsletter prepared by JCBN in conjunction with the Nomenclature Committee of the International Union of Biochemistry (NC–IUB). Comments on any item in this Newsletter, or any other aspect of biochemical nomenclature, may be sent to any member of JCBN, or to its secretary, Dr A. Cornish-Bowden, Department of Biochemistry, University of Birmingham, PO Box 363, Birmingham B15 2TT, England.

The complete 1984 Newsletter was published in *Arch. Biochem. Biophys.* **229**, 237–245 (1984); *Biochem. Internat.* **8**, following p. 202 (1984); *Biochem. J.* **217**, I–IV (1984); *Biosci. Rep.* **4**, 177–180 (1984); *Eur. J. Biochem.* **138**, 5–7 (1984); *Hoppe-Seyler's Z. Physiol. Chem.* **365**, I–V (1984). An abridged version containing JCBN but not NC–IUB material appeared in *Chem. Internat.* No. 3, 24–25 (1984), and excerpts have appeared in *Trends Biochem. Sci.* **9** (1984).

Membership

The current membership of JCBN is as follows: Dr H. B. F. Dixon (Chairman, UK); Dr A. Cornish-Bowden (Secretary, UK); Dr C. Liébecq (as representative of the IUB Committee of Editors of Biochemical Journals, Belgium); Dr K. Loening (USA); Dr G. P. Moss (UK); Dr J. Reedijk (The Netherlands); Dr S. F. Velick (USA); Dr J. F. G. Vliegthart (The Netherlands).

Current panels

JCBN and NC–IUB have several panels in existence that are engaged in reviewing existing recommendations or drafting new ones. A list of topics and the names and addresses of convenors follows so that interested chemists can communicate directly with them if there are points that they believe ought to be covered. Opinions can also, of course, be sent to the Secretary of JCBN, whose name and address are given at the beginning of this Newsletter, or to any member.

Topic
Folic acid

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(including
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Prostaglandins and
thromboxanes

Dr Kurt Loening
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Tetrapyrroles

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One-letter code for
carbohydrate
structures (for
compactly specifying
the structures of
complex
carbohydrates,
especially as
components of
glycolipids and
glycoproteins)

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London WC1E 6BT,
England.

Inositol derivatives

The IUPAC-IUB Commission on Biochemical Nomenclature (CBN) published recommendations in 1973 for naming inositol derivatives (1); in 1976 it added recommendations for naming phosphorus-containing compounds (2), but unfortunately the entries for various inositol phospholipids in table 4 (items 7, 8 and 9) contained several errors. Although these errors were pointed out to CBN and a correction was included when the document was republished in the *Biochemical Journal* (2), the correction was insufficiently prominent to alert readers to the original errors. As a result they persist in the current literature and are a source of confusion in view of the recognized importance in receptor function of the compounds in question. The inositol phospholipids are derivatives of 1D-*myo*-inositol 1-phosphate and not 1L-*myo*-inositol 1-phosphate as published before (2); the bisphosphate of phosphatidylinositol is a 4,5-bisphosphate, not a 3,4-bisphosphate as published. With the axial OH at C-2 above the ring and remote from the viewer the correct structures are as shown in Table 1.

The original table contained a column headed 'Other names', but the names given there are unsatisfactory, because they use a numbering system that refers not to inositol but to glycerol, although the compounds are named as derivatives of inositol. As the names are little used there seems no purpose in inventing correct alternative names and so the column is simply omitted from Table 1.

Hyphens in nucleic acid sequences

In 1970 the IUPAC-IUB Commission on Biochemical Nomenclature (CBN) recommended that hyphens should be used to represent 5'-3' phosphodiester linkages in known nucleotide sequences (3). As there is now little danger of confusion between codon triplets and nucleotide sequences JCBN and NC-IUB believe that this recommendation is no longer needed, though hyphens may, of course, continue to be used for such bonds if desired.

Amide derivatives of amino acids and peptides

The recommendations on Nomenclature and Symbolism for Amino Acids and Peptides (4) indicate how substituents on amino acids and peptides can be symbolized. As a hyphen on the left of a three-letter symbol represents removal of H

from N-2 of the amino acid, and a hyphen on the right of the symbol represents removal of OH from C-1, Ac—Gly—OMe represents CH₃—CO—NH—CH₂—CO—OCH₃, for example. Tables in section 3AA-18.1 of these recommendations give many examples of such usage, but these tables do not include examples of amides of amino acids and peptides. As such amides are often used as substrates for peptidases, symbols for them are given here as examples of the symbolism.

Gly—NH ₂	glycine amide
Tos—Gly—NH—Ph	<i>N</i> -tosylglycine anilide
PhCO—Arg—NH—Np	benzoylarginine 4-nitroanilide (Np symbolizes the 4-nitrophenyl group, as in Val—ONp for valine 4-nitrophenyl ester)
Cbz—Arg—NH—Nap	benzyloxycarbonyl β-naphthylamide (where the symbol Nap refers to the naphth-2-yl group)
Ac—Ala—Ala—Pro—Val—NH—Mec	7-(acetyl-alanyl-alanyl-prolyl-valyl-amido)-4-methyl-coumarin (Mec is often used to represent the 4-methylcoumarin-7-yl group. The release of 7-amino-4-methylcoumarin by peptidases, like that of 7-hydroxy-4-methylcoumarin, i.e. 4-methyl-umbelliferone, by glycosidases may be followed by fluorescence measurements)

It is largely a matter of personal preference how many single bonds are explicitly indicated, e.g. —O—Np or —ONp, —NH—Mec or —NHMec, compare —NH—Me or —NHMe, Ph—CO— or PhCO—. Readers may like to compare the symbols listed above with the symbol Tos—Phe—CH₂Cl, constructed similarly for tosylphenylalanylchloromethane, the chloromethyl ketone discussed in sections 3AA-10.2 and 3AA-18.2 of the recommendations.

References

1. IUPAC Commission on the Nomenclature of Organic Chemistry (CNOC) and IUPAC-IUB Commission on Biochemical Nomenclature (CBN). Nomenclature of Cyclitols. Recommendations 1973. *Eur. J. Biochem.* **57**, 1-7, 1975; *Pure Appl. Chem.* **37**, 285-297, 1974; also pp. 196-202 in ref. 5.
2. IUPAC-IUB Commission on Biochemical Nomenclature (CBN), Nomenclature of Phosphorus-Containing Compounds of Biochemical Importance, Recommendations 1976, *Biochem. J.* **171**, 1-19, 1978; *Eur. J. Biochem.* **79**, 1-9, 1977; *Hoppe-Seyler's*

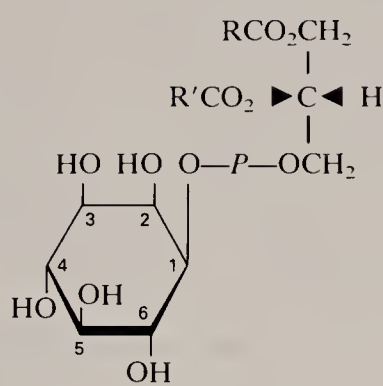
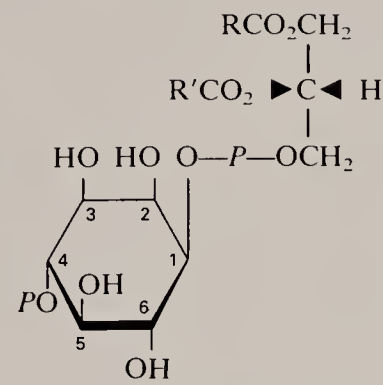
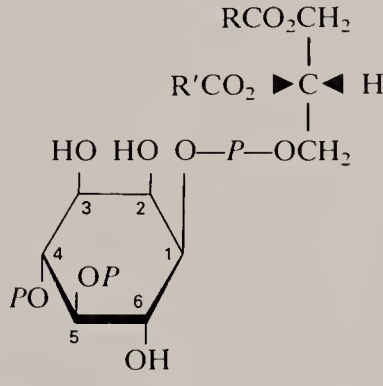
Z. Physiol. Chem. **358**, 599–616, 1977; *Proc. Natl. Acad. Sci. USA* **74**, 2222–2230, 1977; also pp. 203–311 in ref. 5.

3. IUPAC-IUB Commission on Biochemical Nomenclature (CBN). Abbreviations and Symbols for Nucleic Acids, Polynucleotides and their Constituents. Recommendations 1970. *Arch. Biochem. Biophys.* **145**, 425–436, 1971; *Biochem. J.* **120**, 449–454, 1970; *Biochemistry* **9**, 4022–4027, 1970; *Biochim. Biophys. Acta* **247**, 1–12, 1971; *Eur. J. Biochem.* **15**, 203–208, 1970, corrected **25**, 1, 1972; *Hoppe-Seyler's Z. Physiol. Chem.* (in German) **351**, 1055–1063, 1970; *J. Biol. Chem.* **245**, 5171–5176,

1970; *Mol. Biol.* (in Russian) **6**, 167–174, 1972; *Pure Appl. Chem.* **40**, 277–290, 1974; also pp. 116–121 in ref. 5.

4. IUB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN), Nomenclature and Symbolism for Amino Acids and Peptides (Recommendations 1983): *Biochem. J.* **219**, 345–373, 1984; *Eur. J. Biochem.* **138**, 9–37, 1984; *Pure Appl. Chem.* **56**, 595–624, 1984.
5. International Union of Biochemistry, *Biochemical Nomenclature and Related Documents*, The Biochemical Society, London, 1978.

Table 1. Representative phospholipids (involving diesterified phosphoric acid)*

	Recommended name	Abbreviation	Structure
7.	1-(3- <i>sn</i> -Phosphatidyl)-1D- <i>myo</i> -inositol	PtdIns	
8.	1-(3- <i>sn</i> -Phosphatidyl)-1D- <i>myo</i> -inositol 4-phosphate	PtdIns-4- <i>P</i> ; PtdIns4 <i>P</i>	
9.	1-(3- <i>sn</i> -Phosphatidyl)-1D- <i>myo</i> -inositol 4,5-bisphosphate	PtdIns-4,5- <i>P</i> ₂ ; PtdIns(4,5) <i>P</i> ₂	

*This is a corrected version of part of table 4 in ref. 2.

World Exhibition of Achievements of Young Inventors

The exhibition is to be held in the Bulgarian city of Plovdiv, in the grounds of the Plovdiv International Fair, 4–30 November 1985, with the cooperation of the World Intellectual Property Organization, a specialized agency of the United Nations. Inventors born on or after 1 January 1945 are eligible to

participate; official languages are Bulgarian, English, French, German, Russian and Spanish. Applications to participate must be sent by 30 May 1985. Detailed information and the regulations may be obtained from your Bulgarian Embassy.

DIVISION PRESIDENTS

DR MARY L. GOOD

Inorganic Chemistry Division (II)

Dr Mary Good was born in Grapevine, Texas, USA in 1931 and studied at the University of Central Arkansas, obtaining her BS in Chemistry in 1950. She was awarded her MS (1952) and PhD (1955) degrees by the University of Arkansas, Fayetteville, for research in organic and radiochemistry. She started to teach chemistry at Louisiana State University (LSU), Baton Rouge, in 1954, became an assistant professor in 1956 and transferred to the LSU campus in New Orleans, as associate professor, in 1958. In 1961 she became professor of chemistry in New Orleans and, in 1974, Boyd Professor — a distinguished professorship. She moved back to Baton Rouge in 1979 as Boyd Professor of Materials Science, in the College of Engineering. In 1981 Dr Good left the academic world for the industrial, joining UOP Inc in Des Plaines, Illinois, where she is now Vice-President and Director of Research.

Dr Good's scientific research activities have been very largely concerned with the solution of chemical or structural problems by various spectroscopic techniques — the characterization of species in solution or in solid materials. Her work, for example, on the infrared spectra of anionic complexes in liquid-liquid extraction systems led to an understanding of the molecular structures of the species, later developed in the preparation of soluble inorganic complexes for homogeneous catalysis in organic reactions. Using Mössbauer spectroscopy, she showed that detailed chemical and structural information on ruthenium systems could be obtained and hence the characterization of supported ruthenium catalysts was possible. Her versatility is further illustrated by her work on the characterization of the chemical, physical and environmental properties of antifouling marine paints containing organometallic toxicants.

In these short pen-pictures of Division Presidents it was not intended to list the many appointments and awards held by



Dr Mary L. Good, President, Inorganic Chemistry Division (II).

these prestigious people but in this case we can perhaps make an exception, for, amongst the many boards and committees on which she sits, Dr Good is a member of the National Science Board (a US Presidential appointment), which develops policy for the US National Science Foundation and the executive branch of government, and also of the Board of Directors of the Industrial Research Institute, an organization which consists of the Vice-Presidents or Directors of Research of most of the major technology companies in USA. And, while we are about it, let us not forget that she was on the Board of Directors of the American Chemical Society from 1971 to 1980, serving twice as Chairman.

Having read thus far, it will come as no surprise to learn that Dr Good's IUPAC career has been nothing short of meteoric. She was elected directly as Vice-President of the Inorganic Chemistry Division in 1979, succeeding to the Presidency in 1981 for a four-year term.

PURE AND APPLIED CHEMISTRY

The contents of the first three issues of *PAC* are, or are expected to be:

Issue	Pages	Contents	Commission
Vol. 57 (1985) No. 1, January	1-103	Plenary lectures, and Rossini lecture, presented at the International Conference on Chemical Thermodynamics (held jointly with 39th Calorimetry Conference) Hamilton, Ontario, Canada, 13-17 August 1984.	
		<i>Commission reports</i>	
	105-120	Names, symbols, definitions and units of quantities in optical spectroscopy (<i>Recommendations 1984</i>)	I.5 VII.2
	121-148	Test data for normal coordinate calculations	I.5
	149-168	Nomenclature for regular single-strand and quasi single-strand inorganic and coordination polymers (<i>Recommendations 1984</i>)	IV.1 II.2
	169-179	Standard potentials of amalgam electrodes in aqueous solutions, temperature coefficients, and activity coefficients of metals in mercury	V.5
No. 2, February	181-251	Plenary and selected invited lectures presented at the 9th International Conference on Raman Spectroscopy, Tokyo, Japan, 27 August-1 September 1984	
	255-336	Plenary lectures presented at the 1st International Symposium on Solubility Phenomena, London, Ontario, Canada, 21-23 August 1984	
	339-388	Plenary lectures presented at the 9th International Conference on Non-aqueous Solutions, Pittsburgh, Pennsylvania, USA, 13-17 August 1984	
		<i>Commission reports</i>	
	389-403	Microbial adaptation to pesticides	VI.5
No. 3, March	405-470	Additional* plenary lectures presented at the 14th International Symposium on the Chemistry of Natural Products, Poznań, Poland, 9-14 July 1984 *Eight plenary lectures were published in <i>PAC</i> , Vol. 56, No. 8 (1984), pp. 967-1068	
	473-529	Plenary lectures presented at the International Symposium on Quantitative Luminescence Spectrometry in Biomedical Sciences, Ghent, Belgium, 3-6 September 1984	
		<i>Commission reports</i>	
	531-542	Definition of pH scales, standard reference values, measurement of pH and related terminology (<i>Recommendations 1984</i>)	V.5 I.3

33rd GENERAL ASSEMBLY

Amendments to the timetable of meetings

Rescheduling of Meetings

CHEMRAWN — cancel meetings on 30 August and reschedule on *1 September, 9–13 Room 35, 14–18 Room 9*

Commission on Biotechnology (VI.2) — cancel meetings on 3 September and reschedule on *1 September, 9–13, 14–18 Room 42*

Commissions on Food Chemistry (VI.1) and Biotechnology (VI.2) — Joint meeting changed from 3 September to *2 September, 14–15 Room 33*

Additional Meetings

Commission on Pesticide Chemistry (VI.5) [to meet on one additional day]	Friday 30 August	9–13 14–18 (10)
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Commission on Water Chemistry (VI.6)	Monday 2 September	9–13 14–18 (27)
	Tuesday 3 September	9–13 14–18 (7)

<i>Ad hoc</i> meeting of Divisional Representatives on International Cooperation in Biotechnology	Tuesday 3 September	9–13 (4)
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Change of Meeting Rooms

Inorganic Chemistry Division Committee (II)	Friday 30 August	9–12 14–17 (13)
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Commission on Teaching (VII.3)	Sunday 1 September	14–16 (41)
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PLEASE NOTE:

The telephone number of Ecole Supérieure de Commerce de Lyon has been changed. It is:
+33 (7) 833.81.22.

This is also true for the IUPAC Secretariat and Local Information during the General Assembly.

PROVISIONAL RECOMMENDATIONS

IUPAC seeks your comments

The procedure for comment on and approval of IUPAC recommendations on nomenclature and symbols is given in the *IUPAC Handbook 1983–1985*, p. 121. This procedure is now in operation and synopses of the latest Provisional Reports are reproduced on p. 14.

It must be emphasized that copies of the full report cannot be obtained from the IUPAC Secretariat but only from your own national/regional centre.* Copies will be sent on request but on the understanding that comments will be sent to the address on the document not more than 8 months after publication in *CI*.

The most up-to-date list of national/regional centres is:

Argentina

Dr J. M. Barnett, Asociación Química Argentina, Sánchez de Bustamante 1749, Buenos Aires, Argentina.

Asia (Australia, Bangladesh, Hong Kong, Indonesia, Iraq, Korea, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand)

Prof Huang Hsing Hua, Chemistry Department, National University of Singapore, Kent Ridge, Singapore 0511.

Canada

Prof J. ApSimon, Department of Chemistry, Carleton University, Ottawa, Ontario K1S 5B6, Canada.

China

Prof Cui Meng-Yuan, Chinese Chemical Society, POB 2709, Beijing, China.
Prof F. C. Chen, Department of Chemistry, National Taiwan University, POB 30-373, Taipei 107, Taiwan.

Czechoslovakia

Dr Karel Bláha, Czechoslovak Chemical Society, Hradcanské nám. 12, 118 29 Prague 1, Czechoslovakia.

France

Prof Y. Jeannin, Comité National de la Chimie, 28 rue Saint-Dominique, F-75007 Paris, France.

FRG, Austria and Switzerland

Prof H. Grünewald, c/o Verlag Chemie GmbH, Postfach 1260/1280, Pappelallee 3, D-6940 Weinheim, Federal Republic of Germany.

Hungary

Prof E. Pungor, Általános és Analitikai Kémiai Tanszék, Budapesti Műszaki Egyetem, Gellért tér 4, H-1521 Budapest XI, Hungary.

India

Mr A. K. Bose, Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi-110002, India.

Israel

Prof S. Sarel, Department of Pharmaceutical Chemistry, School of Pharmacy, Hebrew University of Jerusalem, POB 12065, Jerusalem, Israel.

Italy

Prof F. Rallo, c/o Società Chimica Italiana, 48 Via le Liegi, I-00198 Roma, Italy.

Japan

Dr H. Hamada, Executive Director, Chemical Society of Japan, I-5 Kanda Surugadai, Chiyoda-ku, Tokyo, 101 Japan.

Netherlands

Ir E. J. de Ryck van der Gracht, Koninklijke Nederlandse Chemische Vereniging, Postbus 90613, 2509 LP Den Haag, Netherlands.

Scandinavia

Dr K. Samuelsson, Acta Chemica Scandinavica, Wallingatan 26 A, S-111 24 Stockholm, Sweden.

South Africa

Dr J. R. Bull, Organic Chemistry Division, National Chemical Research Laboratory, POB 395, Pretoria 0001, Republic of South Africa.

UK

Dr A. McNaught, Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN, UK.

USA

Dr Marianne Brogan, Journals Department, American Chemical Society, 2540 Olentangy River Road, POB 3330, Columbus, Ohio 43210, USA.

USSR

Prof G. B. Bokij, Commission on Nomenclature, National Committee of Soviet Chemists, Academy of Sciences of USSR, Kosygin Street 4, SU-117977 Moscow V-334, USSR.

*If you are not within the jurisdiction of any of these centres, please write to: Dr K. L. Loening, Chemical Abstracts Service, POB 3012, Columbus, Ohio 43210, USA.

Recommended terminology for the description of 'Carbon as a solid': Part I (*Provisional*)

'Carbon as a solid' covers all natural and synthetic substances consisting mainly of carbon atoms, such as single crystals of diamond and graphite, as well as the full variety of polycrystalline industrial carbon and graphite materials. Because of the increasing interdisciplinary importance of these materials in science and technology, IUPAC has taken on the responsibility for recommendations of precise descriptions of the relevant terms which are consistent with scientific nomenclature. The recommendations were prepared by Commission II.3, Subcommittee SC 1 on Characterization and Terminology of Carbon, in close cooperation with an International Committee consisting of 30 specialists in carbon science and industry from all over the world and representing the national 'Carbon Societies', such as the American Carbon Society, Groupe Française sur Carbone, British Carbon Groups, Arbeitskreis Kohlenstoff of the German Ceramic Society, Japanese Carbon Society, Indian Carbon Society, etc., and in contact with ASTM. All recommended descriptions have been prepublished in the international scientific journal *Carbon* (Pergamon Press, 1982) and were finally approved by the International Committee after refining by the attendees of the periodically organized International Conferences on Carbon (1980–83).

As a first result 28 terms have been selected according to a priority ranking and are presented in alphabetical order: Amorphous carbon, Carbon, Carbon fibres, Carbonization, Carbon material, Coalification, Coke, Diamond, Glass-like carbon, Graphite, Graphitic carbon, Graphitizable carbon, Graphitization, Graphitization heat treatment, Graphitized carbon, Graphite material, Hexagonal graphite, Natural graphite, Non-graphitic carbon, Non-graphitizable carbon, Nuclear graphite, Polycrystalline graphite, Polygranular carbon, Polygranular graphite, Pyrolytic carbon, Pyrolytic graphite, Rhombohedral graphite, Synthetic graphite.

Further descriptions for about 70 additional terms are in preparation. After completion of the cooperative work a systematically arranged compilation will be published.

Comments on these recommendations are welcome but must be received by Prof E. Fitzer by the end of November 1985.

Nomenclature of Inorganic Chemistry — Revised Edition (1986?). Chapter I–4: Formulae (*Provisional*)

This Chapter is intended to serve as a guide to the users of nomenclature of inorganic chemistry in writing formulae correctly according to the rules

recommended by IUPAC. It contains the definitions of types of formula, and shows how to indicate proportions, oxidation states and ionic charge of constituents, and to use structural modifiers of the compounds.

The sequence of citation in formulae is based on the alphabetical order of the symbols of the electropositive and electronegative constituents, respectively. A guide to writing the formulae of isotopically modified compounds is included, with cross reference to the detailed IUPAC recommendations. Numerous examples are given to illustrate the rules. Finally, a table summarizes the method for assignment of the formulae of compounds.

The rules of formulae construction are in full agreement with the rules of *Nomenclature of Inorganic Chemistry, 1970* (Red Book), but Chapter I–4 gathers together all the basic information on formulae which was discussed in different chapters of the old Red Book. In addition, some rules, such as that concerning alphabetical ordering, are extended and others explicitly expressed so that it is not necessary to infer them from the examples. This last method of presentation used in the old Red Book had been widely criticized. The number and types of examples have been increased.

Comments on this document must be received by Dr G. J. Leigh before the end of November 1985.

Reporting data on adsorption from solution at the solid/solution interface (*Provisional*)

This document is a companion to that on Reporting Physisorption Data for Gas/Solid Systems, and is designed to supplement the discussion of adsorption at the solid/solution interface given in the *Manual of Symbols and Terminology for Physicochemical Quantities and Units, Appendix II, part I; Definitions, Terminology and Symbols in Colloid and Surface Chemistry, PAC 31*, pp. 579–638 (1972).

The definitions of adsorption from solution used here are essentially those adopted in the Manual. A discussion is then given of the operational determination of adsorption from solution, and includes an outline of various available experimental techniques, and recommendations concerning the precautions which need to be taken to ensure reliable results. Recommendations are made regarding the form in which results should be published.

The interpretation of adsorption data in thermodynamic terms is discussed as is the role of adsorption models in elucidating the molecular processes involved in adsorption. Attention is also drawn to the problems associated with the effects of surface heterogeneity on adsorption from solution.

Comments on this document must be received by Prof D. H. Everett by the end of November 1985.

LA MAISON DE LA CHIMIE

The Golden Jubilee of the Maison de la Chimie was celebrated, on Friday 16 November 1984, by a ceremony attended by the French Minister of Research and Technology, M Hubert Curien. In his address at the ceremony Prof J. Bénard, IUPAC President 1971–73 and current President of the Fondation de la Maison de la Chimie, related the history of the Foundation and recalled that the first President of IUPAC, Prof C. Moureu, had suggested that the permanent headquarters of the Union should be located in the then projected central meeting place of all French chemical associations, thus giving the project an international dimension. In his short article in *CI*, 1984, No. 3, pp. 14–16, Prof Bénard stated, quite correctly of course, that the Foundation was set up in 1927. Why then a 50th anniversary meeting in 1984? On 1 December 1934 the Maison de la Chimie, the building itself, was officially opened, after its conversion into a conference centre, by the President of France, M Albert Lebrun.

It was unthinkable that this anniversary, of the establishment which for many years had held the archives of the Union, should pass unnoticed by IUPAC. Accordingly, on behalf of the President, Dr Williams attended as the official representative of IUPAC and presented a commemorative scroll to Prof Bénard.



L'UNION INTERNATIONALE DE
LA CHIMIE PURE ET APPLIQUÉE
présente ses meilleures félicitations
à
LA MAISON DE LA CHIMIE
à l'occasion de la Célébration de son
Cinquantenaire

Depuis son inauguration en 1934, le but de la Maison de la Chimie a été de favoriser l'avancement de la Science chimique et de ses applications, et de développer les échanges entre savants, universitaires, industriels et des organismes divers français et internationaux. Un personnage qui a joué un rôle important lors de ces premières années en tant qu'Administrateur était Jean Gérard, qui a été simultanément le Secrétaire Général de l'Union Internationale de la Chimie Pure et Appliquée.

Malgré les événements internationaux survenus pendant toutes ces années, cette belle maison historique a toujours essayé de rester un lieu de réunion privilégié pour les chimistes de toutes nationalités.

L'Union Internationale de la Chimie Pure et Appliquée voit avec plaisir que les activités se développent suivant les objectifs prévus, notamment par l'hébergement de sociétés savantes et la coopération avec des organismes scientifiques, y compris le Comité National de la Chimie, le Centre National de la Recherche Scientifique, l'Académie des Sciences, les universités, et les associations reconnues d'utilité publique, et offre ses meilleurs vœux pour la continuation de sa réussite.

16 Novembre 1984

W. G. SCHNEIDER
Président



Dr Williams presents the commemorative scroll to Prof Bénard.

SUMMARY MINUTES OF COMMITTEE AND COMMISSION MEETINGS

Commission I.6 — Colloid and Surface Chemistry including Catalysis.

Subcommittee on Catalyst

Characterization: Berlin (West), FRG, 6–7 July 1984

The policy relating to the catalyst characterization chart was discussed together with the procedure for preparing the text. The following preliminary draft sections were read and discussed:

- General description of the catalyst system (B. Delmon);
- Physical properties (J. W. Hightower);
- Stability of catalyst systems (P. B. Wells);
- Catalytic properties (L. Riekert).

In addition, contributions by various members of the Subcommittee on the following topics were considered:

- Surface elemental composition of different phases;
- Concentration profiles;
- Total surface area and pore structure;
- Sensitivity to poisoning and time-dependent characteristics.

The Subcommittee agreed to hold its next meeting near London, UK, in March 1985.

J. H. Block

Commission II.3 — High Temperature and Solid State Chemistry: Vienna, Austria, 6–7 September 1984

Publications

The paper from Task Force TF-4 entitled *Results of a collaborative study on zirconia-based oxygen gauges*, by Anthony, Baumard, and Corish appeared in *PAC*, Vol. 56, pp. 1069–1094 (1984). Sōmiya reported that the full text of the report from which the above was abstracted is to be published in Japan. The first publication on the terminology and characterization of carbon now lies with IDCNS. The *Bibliography on the High Temperature Chemistry and Physics of Materials* has been published on schedule. A list of publications is given in the extended minutes.

Meetings

The Fourth International Conference on High Temperature and Energy-Related Materials sponsored by the Commission was held at Santa Fe, NM, USA, 2–6 April 1984. This highly successful conference contained 75 papers, and 130 participants from 10 countries. Rosenblatt and Skaggs were the conference chairmen. The plenary lectures have been published in *PAC*, Vol. 56, pp. 1511–1600 (1984), and the other papers will be published in a special issue of *High Temperature Science*.

The next meeting in this series is scheduled in Rome, 25–30 May 1987. DeMaria will present to the Commission in Lyon the detailed plans for this conference. Clark distributed an earlier draft of a proposal for a conference in the series to be held in Pretoria, South Africa. He proposed a date in late March or early April in 1989. He will bring a revised plan to Lyon.

The 8th International Conference on Solid Compounds of Transition Elements will be held in Vienna, 9–13 April 1985. The Commission approved sponsorship of this conference.

Projects

IUPAC Thermochemical Data Bank (TF-3, Alcock). Komarek reported that owing to a lack of funds and to the existence of competing commercial data banks this project has been laid aside.

Terminology and Characterization of Carbon (SC-1, Fitzer). This activity has two parts. The purpose of Part I on 'Terminology' is to prepare and publish definitions for about 90 terms that have been used to describe the many types of carbon and graphite. Publication will occur in four stages or sets. The objective of Part II on 'Characterization' is the recommendation of testing methods for the characterization of all carbon and graphite materials using the most advanced techniques. Fitzer reported that the work on this project is going well. The subcommittee met in Bordeaux in July. The first publication containing definitions of nearly 30 terms has been prepared and submitted. It is now in the hands of IDCNS. The subcommittee has accepted the second set containing 24 terms. These had been, preliminarily, published in *Carbon*, for comment, have been approved by the Commission, and are being submitted to *PAC* for publication. The third set will contain about 14 terms and should be submitted soon to *Carbon* for comment.

Carbide–Graphite Secondary Temperature Standards (TF-6, Komarek). The purpose of this activity is to recommend as secondary temperature standards several metal–graphite systems whose eutectic or transition temperatures will be established by collaborative measurements in several laboratories. Ettmayer showed to the Commission some of the samples he has prepared by hot pressing. Samples will be distributed to participating laboratories.

High Temperature Mass Spectrometry Ionization Cross Sections (TF-8, Drowart). The purpose of this project is to publish an assessment of electron impact ionization cross-sections for gases and vapours of importance in high-temperature studies, and in the light thereof to publish a discussion on the accuracy and repeatability of mass spectrometric determinations of dissociation energies for selected high-temperature molecules. A draft report is being written and will be circulated within a few weeks to the task force. A report will be ready for Commission action in Lyon.

Reference Electrodes for Solid State EMF Studies (TF-9, Rand). The purpose of this project is to publish mutually consistent standard values of oxygen potentials for a few high-temperature reference electrodes which can be recommended for high-quality work in solid state electrochemistry. Rand reported that the work of the collaborative study group will continue along the original lines, weighing heavily the work of John Haas of the US Geological Survey in Reston, Virginia, who has collected some 10 000 data from some 500 studies. A report will be prepared by Rand and circulated to the task force in time for the Commission to consider it in Lyon. The paper will include guidelines for experimental studies. The Commission agreed to transform this collaborative study group (CSG-4) into a task force (TF-9).

Zirconia-Based Electrolytes for High Temperature Solid State Oxygen Gauges (TF-4, Anthony, Baumard, and Corish). The purpose of this project has been to evaluate commercially available zirconia-based electrolyte tubes for oxygen gauges. With the publication of *Results of a collaborative study on zirconia-based oxygen gauges*, PAC, Vol. 56, pp. 1069-1094 (1984), the splendid work of this task force has been completed. The Commission was delighted to learn from Sōmiya that the considerably longer full report will be published in the Japanese journal which published the papers from Petzow's ZrO_2 conference.

Melting Points of Refractory Oxides (TF-5, Rand, Coutures, Hlaváč). This project has two purposes: (1) To publish recommended melting points, with uncertainties, for those oxides for which literature values are seemingly sufficiently concordant (oxides of Groups II, III, IV, and Rare Earths), and (2) to sponsor a collaborative experimental investigation in several laboratories to establish melting point values for other well-characterized oxides, especially CaO , Gd_2O_3 , and HfO_2 . Hlaváč reported that the work on the melting point of calcium oxide is going slowly. Sōmiya reported some results from his laboratory on the melting points of HfO_2 , Cd_2O_3 , Y_2O_3 , CaO , and ZrO_2 . Results are expected from Coutures, Rifflet and possibly from Noguchi and Gurvich.

Coutures reported that he hopes to make additional melting point measurements on Gd_2O_3 under different atmospheres to establish the effect of stoichiometry on the melting point.

Rand reported that a final draft of the revision on the manuscript of the melting points of the lanthanide oxides should be circulated by Christmas to various committee members for critical examination.

The Bibliography on the High Temperature Chemistry and Physics of Materials (TF-2, Hocking). The purpose of this project is to publish quarterly citations to current literature in the high-temperature field. DeMaria presented the report submitted by Hocking. The number of paying subscribers is expected to be about 160, an increase from last year's 152. Because of a slight deficit for the 1984 year the Commission agreed to increase the subscription price to £9.50, an increase of £1. The bibliography is being sent to the *Bulletin of Chemical Thermodynamics* for inclusion therein as previously agreed. Publication of the *Bulletin* has been slow, and thus far has contained no part of the *Bibliography*.

Appendix IV to the Green Book and the Standard State Pressure (WP-2, Rosenblatt). The purpose of this project is to work with Commission I.2 and other IUPAC bodies to make recommendations on resolving the dispute on the standard state pressure. Komarek reported that Rosenblatt's final version prepared after the Santa Fe meeting in April 1984 has been sent to the Chairmen of Commissions I.1, I.2, I.3, I.4, I.5, III.2, V.5, V.6 and V.8 and to the Presidents of Divisions I, II and III. Replies have been received from several members of these Commissions. Almost all of them are opposed to the suggested change in the standard state pressure from one atmosphere to one bar. A joint meeting with a few interested people from Commission I.2 will be held in Lyon.

Properties of Silicon Nitride Powders (CSG-3, Sersale, Petzow). The purpose of this activity is to publish a review of the measurements and standardization of silicon nitride powders, including the ratio of α - to β -modifications, the content of elemental silicon, the adherent SiO_2 , and the determination of grain shape, grain size, grain size distribution, and specific surface. The importance of this project arises because the properties of a final Si_3N_4 -based product depends strongly on the nature of the starting powders. Petzow distributed a third draft of a manuscript entitled *Characterization of Si_3N_4 powders*.

Classifications of Si_3N_4 -based materials (TF-7, Petzow, Sersale). The purpose of this project is to publish a classification of the Si_3N_4 -based materials which heretofore have been inexactly described as 'densified silicon nitride'. The project will emphasize the strong interdependence of chemical composition, phase diagram type, microstructures, and properties of the materials. Work on this project has begun, and will follow closely the project on powders (CSG-3). A further report will be prepared for Lyon.

Silicon carbide powders and products have the same problems as do the silicon nitride powders and

products. Petzow will contact workers actively engaged with SiC and investigate the possibility of mounting a similar project.

Nomenclature of Non-Stoichiometric Compounds (WP-1, Metselaar, Corish). This project has two purposes: (1) To prepare a revision of Chapter 9 of the existing Red Book entitled, *Crystalline phases of variable composition*; and (2) to prepare an entirely new, extensive text on the nomenclature of solids. Metselaar presented the August 1984 draft of what will be chapter I-6. As usual, this draft received a number of comments. Since Lyngby the text has been revised three times. The July 84 draft was distributed among CNIC members. The August 84 draft has been slightly revised according to the wishes of CNIC. Metselaar will revise this draft and send it to Dr Leigh, the editor of the Red Book. The revised copy will be distributed among the CNIC members and the fifteen referees who are required by the IUPAC guideline procedures.

Thermodynamic and Transport Properties of Alkali Metals (TF-1, Ohse). The purpose of this project is to publish a critical compilation of the structural, thermodynamic, and transport properties of alkali metals. Ohse presented a report detailing the developments on this monumental project since Lyngby. All chapters have been finished except 2.5.1, 2.5.2, 6.1, 6.2, 9.1-4. Final drafts should be submitted to Blackwells by November.

Ionic Conductivity of Fluorite Structure Solids (PST-10, Anthony, Baumard). By considering carefully the new guidelines for projects, the preliminary survey team will prepare a detailed proposal for consideration by the Commission at Lyon. Baumard reported that because of the great interest in ZrO_2 and ThO_2 electrolytes, work should begin with them.

New projects

Coutures presented two suggestions for possible new projects, high-temperature experimentation with CW power lasers and structural characterization of silicate glasses. Clark suggested the possibility of a project on nomenclature of phase transformations.

Membership

The nominations of Dr Enrique J. Baran by Argentina and Prof Shiguyuki Sōmiya by Japan, as National Representatives from those countries, were approved.

Next meeting

The Commission will meet at the 33rd IUPAC General Assembly, Lyon, 30 August-3 September 1985.

Paul W. Gilles

Commission III.1 — Nomenclature of Organic Chemistry: Montreal, Canada, 30 July-4 August 1984

The Commission considered progress with the following projects:

Treatment of Variable Valence in Organic Nomenclature (the λ -Convention). This project has been completed with the publication of *Recommendations 1983* (PAC, Vol. 56, pp. 769-778, 1984).

Numerical Terms. The provisional recommendations for extending Rules A-1.1 and A-2.5 concerning numerical terms used in organic chemical nomenclature (PAC, Vol. 55, pp. 1463-1466, 1983) were revised according to comments received and are ready to be submitted for approval to publish as *Recommendations 1984*.

Nomenclature for Cyclic Organic Compounds with Contiguous Formal Double Bonds (the δ -Convention). Recommendations for the use of the descriptor δ^c , where c is the number of formal double bonds terminating at a skeletal atom, were revised on the basis of comments from the 'specialist' review in the new IUPAC publication procedure, and are ready to be submitted for the necessary approvals so as to be made available as provisional recommendations for general review.

Cyclophane Nomenclature. On the basis of comments from the 'specialist' review in the new IUPAC publication procedure, the report *Nomenclature of cyclophanes* will be delayed so that names and numberings based on the system already used in the *Beilstein Handbuch* can be added to all appropriate examples.

Nodal Numbering. Recommendations for a general numbering system for acyclic systems and cyclic systems as used in the recommendations for cyclophane nomenclature have been reviewed by 'specialists' and are ready to be submitted for the approvals necessary before issue as provisional recommendations for general review. However, because of the delay in processing the cyclophane recommendations which illustrate the use of the system, the nodal numbering document will be extended to include acyclic/cyclic systems and ring assemblies; further illustrations of the value of the system in other areas of organic nomenclature will also be added.

Revision of the 1979 Edition of 'Nomenclature of Organic Chemistry'. The next edition of the IUPAC Organic Nomenclature Rules will be divided into two parts. Part I will contain the basic principles for deriving an unambiguous name and Part II will provide the detailed rules for deriving a unique IUPAC preferred name and for describing stereochemistry and isotopic modification. All chapters of Part I were approved and will be compiled into a single draft during the coming year.

Other projects. The development of comprehensive recommendations for naming *fused ring and bridged*

fused ring systems, natural products and related substances (Section F), and (*free*) *radicals* continues. Other topics under study include: a glossary of class names, comprehensive stereochemical nomenclature (Section E), acid nomenclature, and a glossary of stereochemical terminology.

Membership

Prof P. Grünanger (Italy) and Prof A. T. Balaban (Romania) were confirmed as National Representatives.

Next meeting

The Commission will meet next in Lyon, France, 24–29 August 1985.

G. P. Moss

Commission III.2 — Physical Organic Chemistry*: Burlington Vermont, USA, 8–10 August 1984

The Commission meetings were preceded on 6 and 7 August by meetings of the joint working parties on stereochemistry and on organic class names. The main work of the Commission on this occasion was to give detailed scrutiny to near-final drafts of rules for naming transformations and for symbolizing reaction mechanisms. Most of the rules should be available in publishable form in time for the Lyon General Assembly.

A review of the *Glossary of terms in physical organic chemistry* (V. Gold, *PAC*, Vol. 55, pp. 1281–1371, 1983) is likely to be needed in 1987. The Commission discussed the need for glossaries in other areas, for example organic electrochemistry, and the possible amalgamation of IUPAC glossaries.

The Commission expressed support for a paper from Commission II.3 (High Temperature and Solid State Chemistry) opposing the recommendation to redefine standard pressure as 10^5 Pa.

The Commission intends to investigate the desirability of formulating recommendations on publishing policies in physical organic chemistry, particularly about the detail in which experimental techniques and results are reported, and in organic molecular orbital calculations and related work in physical organic chemistry.

Richard A. Y. Jones

*For previous summary minutes see *CI* 1983, No. 5, 59–60.

Commission IV.2 — Polymer Characterization and Properties. Working Party on Supported Polymer Films: Lugano, Switzerland, 24 September 1984

Discussion of new projects was the only item on the agenda of the interim meeting of the Working Party.

The project proposed by Kooistra on 'Characterization of Cure of Coatings in Relation to Performance Properties' was postponed primarily because of personal difficulties but also related to lack of participation. From the discussion Dulog extracted another proposal, with more immediate practical importance, entitled 'Corrosion Protection by Organic Coatings; Combined Efforts of Various Laboratories, Different Methods.' It is hoped that this proposal will have sufficient interest and support from various experts. Gerster reported on his results concerning the possibilities of measuring the dielectric constant on the surface of thin films in order to characterize degradation caused by weathering; the technical problems are now nearly solved with the cooperation of Centre Electronique Horloger in Neuchâtel. As a last point Oesterle stressed the importance of the influence of free volume as a fundamental quality of the paint film, and it was resolved to keep this problem in mind. The next meeting of the Working Party will be in Germany, but the exact date and place have not yet been fixed.

J. Sickfeld

Commission VII.1 — Automation and Clinical Chemical Techniques: Barcelona, Spain, 15 October 1984

Documents for discussion

Bioanalytical nomenclature. The document prepared by Dr Burtis was discussed. He will write an introduction explaining the reasons for its preparation. A copy is to be sent to Prof Sunderman and Prof Montalbetti for their information only.

Classification of analysers in clinical chemistry. Prof Haeckel sought the opinion of the members of the Commission on whether the concept of preparing a classification of clinical chemical analysers was useful. It was agreed that the document should be produced. Prof Bonini will send to Prof Haeckel a copy of the method of classification used in Henry's book. It will be sent to Prof Montalbetti. The distribution list should include other professional societies and the industry.

A new concept for the presentation of carry-over effects. The document will be revised to place more emphasis on reagent cross reactivity and the other points. At present it appears to place too much emphasis on specimen-to-specimen carry-over. The other combinations, as discussed on page I, should be considered in greater depth. Dr Hjelm questioned the use of information from a paper he published in 1968. He felt that there may be more updated information available. Prof Bonini was asked to provide an introductory paragraph to explain the terms used.

Nomenclature for automated and mechanized analysis. This document has been sent out for final comment. It has been sent to Prof Montalbetti and

accepted by the Division. It has been prepared in camera ready form for publication as a provisional recommendation. Dr Geary is to send copies to the National Representatives.

Nomenclature for ED processing and micro-processors. Dr Perone has indicated that he feels that Prof Bonini's comments on the document are appropriate. He will discuss the proposed rewrite of the document with Commission V.3. Prof Bonini is to distribute the document. Dr Burtis will contact Dr Perone to offer assistance with the storage and retrieval document.

National Representatives

It was agreed that the Minutes and all other information should be provided to National Representatives.

Future activities

It was agreed to complete existing projects before embarking upon other activities. In spite of this decision, it was further agreed that thought should be given to providing nomenclature for the techniques which will be used in clinical chemistry in the future, such as high-powered pulsating lasers.

Next meeting

The Commission will meet at the 33rd IUPAC General Assembly, Lyon, on Friday 30 August, Saturday 31 August and Sunday 1 September 1985.

R. Haeckel

Commission VII.2 — Quantities and Units in Clinical Chemistry: Strasbourg, France, 10–12 October 1984

Provisional minutes of Commission Meeting (IFCC–EPQU Meeting) held in London, UK, 19–21 March 1984, were approved and minutes of the IFCC–EPQU Open Meeting held in Rio de Janeiro, Brazil, 1 May 1984, were reviewed.

Status Reports and Review of Projects

QUCC: Nebulizer and flame properties in flame emission and absorption spectrometry: published as a provisional recommendation in *PAC*, Vol. 56, pp. 2499–2504 (1984).

Physicochemical quantities and units in clinical chemistry with special emphasis on activities and activity coefficients: published as a recommendation in *PAC*, Vol. 56, pp. 567–594 (1984).

Definitions, symbols, quantities and units in optical spectroscopy: to be published as a joint recommendation (with Commission I.5) in *PAC* in January 1985.

Nomenclature of derived quantities: following review and suggestion by IDCNS, a draft document will be published in summary form for input, and also distributed for comment to other organizations. Subsequently a final proposal on the document will be submitted to IDCNS.

QUCC: A special unit for the quantity: Number (of Entities): a proposal for a special unit name 'item', symbol 'I' was submitted to IDCNS for consideration. As a result, the Commission was made aware of an ISO proposal: 'The coherent unit for any dimensionless quantity is the number one, 1. When the value of such a quantity is expressed the unit 1 is generally not written out explicitly', to be placed in a number of ISO standards. It was decided to defer further action until a definitive ISO statement is made, and included in its standards.

Glossary of terms on quantities and units for clinical chemistry: a draft document (containing approximately 150 items) was reviewed and a standardized format for presentation was agreed upon.

QUCC: Classification, quantities and units for protein binding assays in the clinical laboratory: a framework for the project was agreed upon whereby a number of assay systems will be described according to approximately 30 criteria considered important for such assays. Subsequently, the criteria will be reviewed in order to emphasize the ones that are most critical and significant for the classification of such assay systems. A draft document is being prepared.

QUCC: Quantities and units for metabolic processes as a function of time: following a review of a draft project outline, a format was agreed upon. A particular concern was how to define and/or explain processes, and to differentiate those that are frequently used as quantity names, and those that should be used in the systematic naming of a quantity. A draft 1 document is being prepared.

Future Meetings

March 1985, La Chaux de Fonds, Switzerland (IFCC–EPQU)

August 1985, Lyon, France (IUPAC–CQUCC, 33rd IUPAC Assembly).

H. Peter Lehmann

ACHEMA 85

The large Congress and exhibition will be a focus for international discussions in all fields of chemical engineering, biotechnology and environment protection during the week 9–15 June 1985 at Frankfurt am Main, FRG. The full programme and all other details for prospective participants should now be available from DECHEMA, Theodor-Heuss-Allee 25, Postfach 970146, D–6000 Frankfurt (Main) 97, Federal Republic of Germany.

IUPAC PUBLICATIONS

Solubility Data Series, Vol. 15. Alcohols with water

This volume, the first from the liquid-liquid section of the Solubility Data Project organized by IUPAC, covers binary systems containing only water and a monohydroxy alcohol. The editor, Allan Barton of Murdoch University in Perth, Western Australia, has brought together information on miscibility limits for 76 alcohols, ranging from propanol to octadecanol.

In the case of most lower alcohols there is generally a large amount of imprecise and conflicting data. The evaluators of these systems have provided an invaluable guide to the literature and in most cases have been able to recommend values with some confidence. In contrast, for some of the lower alcohols and most of the higher alcohols there is a noticeable lack of precise information, so just being able to find the limited information is a valuable service to the users of the volume.

To illustrate the range of solubilities covered, methanol and ethanol are fully miscible under all reported temperature and pressure conditions, 1-propanol and water are immiscible only between -10.5 and -1.7°C , while at the other extreme the maximum amount of 1-hexadecanol that water can accommodate is 10^{-7} mol/L. It is also shown that although the proportion of alcohol in the aqueous phase falls off rapidly as the alcohol chain length increases, the proportion of water in the alcohol-rich phase remains relatively high even for long-chain alcohols. Thus a water:alcohol ratio as high as 0.3 is observed for 1-dodecanol, compared with 1 for 1-butanol.

For the normal alcohols, an empirical expression based on carbon chain length has been found to correlate the solubility in water over the whole range from 4 to 16 carbon atoms, in some cases providing more reliable values than are available experimentally.

For many of the systems the general trends in behaviour are illustrated graphically at the same times as the recommended values are presented numerically. The alcohols are indexed by IUPAC, *Chemical Abstracts* and common names, as well as formula and Registry Number. This volume will be of great value to a very wide range of users, particularly those in biological, environmental, pharmaceutical, cosmetic, petrochemical and other industrial fields.

This book is published by Pergamon Press, price US\$100. ISBN 0-08-025276-1.

Solubility Data Series, Vol. 16/17. Antibiotics: I. β -Lactam antibiotics

Publication of this double volume of the IUPAC

Solubility Data Series (Vol. 16/17) signals the extension of the project into study on the solubilities of compounds of pharmaceutical and therapeutic relevance — the antibiotics. In many cases of course these compounds are semi-synthetic, being the product of organic and bacterial synthesis.

Although the antibacterial activity of bacterial products has been demonstrated for almost 90 years, official standards for compound activity were not set until 1944. The subsequent years have seen pharmaceutical concerns investing great sums into the research and development of antibiotics. Even today for example, the Japanese pharmaceutical industry in particular pays great attention to antibiotics which are derived from soil-based microorganisms.

Only a few of the antibiotics discovered are today developed to the extent that a great deal is known about their (physical) organic chemistry. This series of volumes attempts to compile all published information on the solubilities of antibiotics. This first issue deals with β -lactam antibiotics, and encompasses some 45 solid compounds examined in up to 27 different aqueous and non-aqueous liquid solvents. The data compiled come from a variety of sources though in many cases they are single observations.

In common with other volumes each compilation sheet contains the original data, an indication of the method(s) used, compound purity, and the accuracy and precision of the observation. Subsequent volumes will deal with antibiotics that are peptides (1985), macrocyclic lactones (1985), carbohydrates (1986) and aromatics (1986).

Since values of the solubilities of antibiotics are of significance *inter alia* during their manufacture (and isolation), and for consideration of their biopharmaceutical, pharmacokinetic and pharmacodynamic properties, it is hoped that the information given in the volumes will be of use in those areas, and that the deficiencies in the literature revealed by this work will encourage more detailed studies on the solubility of antibiotics.

This book is published by Pergamon Press and costs US\$200. ISBN 0-08-029235-6.

International Thermodynamic Tables of the Fluid State — 8. Chlorine (*Tentative Tables*)

The xviii + 162-page volume, by S. Angus, B. Armstrong and K. M. de Reuck, is the first publication of the Thermodynamic Tables Project of Commission I.2 classified as 'tentative tables'. This is because available data, and any expected in the foreseeable future, are not adequate to form the basis of the extensive tables normal in this set of publications but, on the other hand, it is concerned

with an important fluid; chlorine is becoming one of the most widely used of chemicals. It was considered that a combination of data and estimation could be used to construct tentative tables which would be an improvement on those currently available.

Sections 1 and 2 of the text are concerned with discussion of available data and estimated data, respectively. The way in which the equation of state $P(\rho, T)$, was constructed from these data is dealt with in Section 3. Section 4 explains how the tabulated properties were calculated from the chosen equation. In addition, the data and equations correlating them are discussed for the saturation curve.

The tables presented here give the volume, entropy, enthalpy, isobaric heat capacity, compression factor, fugacity/pressure ratio, Joule–Thomson coefficient, ratio of the heat capacities and speed of sound as a function of pressure and temperature; and the pressure, entropy, internal energy and isochoric heat capacity as functions of density and temperature, for the gas and liquid states from 0.025 to 25 MPa at temperatures from 180 to 900 K. Zero pressure tables are given, as are the tables of the properties of the fluid phases along the saturation curve.

Equations which reproduce these properties within these limits are given, as well as estimates of uncertainty of some of the principal properties listed.

The book is No. 31 of the *IUPAC Chemical Data Series* and is available from Pergamon Press, price US\$47.50. ISBN 0-08-030713-2.

RECENT REPORTS

Microbial adaptation to pesticides

Edaphic and genetic processes influence the rate of microbial adaptation to pesticides and subsequent metabolism of these pesticides in soils. Availability of the degradable molecule to soil microorganisms is determined by a number of competing sorption reactions with soil colloids. Kinetic studies on readily biodegradable herbicides exhibit an initial lag phase followed by a rapid decline in concentration. A number of genetic alterations can occur in bacteria responsible for degradative enzyme synthesis during the lag phase. In addition to specific internal DNA sequence changes and recombinations, external DNA additions can occur via plasmids between various soil bacteria. Degradative plasmids for the herbicides 2,4-D and dalapon have been isolated and characterized. There are interesting parallels between the development of antibiotic resistance in the clinical environment and enhanced pesticide metabolism in problem soils.

This report, No. 19 in the series *IUPAC Reports on Pesticides*, was prepared for Commission VI.5 and has been published in *PAC*, Vol. 57, pp. 389–403 (1985).

Purification of solvents for electroanalysis: Tetrahydrofuran and dioxane

This report is a continuation of the project of the Commission on Electroanalytical Chemistry which led to the publication, in 1982, of the compilation *Recommended Methods for Purification of Solvents and Tests for Impurities* (Pergamon Press) in which ten protic and aprotic solvents are discussed. The present report is the first to deal with the important class of saturated cyclic ethers, solvents that are used extensively in organometallic chemistry and battery technology. Key properties and uses of these solvents are briefly outlined. In the discussion of recommended purification methods and tests for impurities, special emphasis is placed on the presence of peroxides which constitutes a serious explosion hazard in the handling of many ethers.

The report is scheduled for publication in the April 1985 issue of *PAC*.

IUPAC PEOPLE

We congratulate:

Prof W. C. Purdy (Commission VII.4) on receiving the 33rd American Association of Clinical Chemists Award for outstanding contributions to clinical chemistry.

Prof R. C. Kapoor (Commission V.5) on being chosen for the Acharya P. C. Ray Memorial Lecture Award (1983) by the Indian Chemical Society in recognition of his contributions to chemistry.

Prof S. Nagakura (IUPAC Past-President) on his nomination to the Japan Academy in recognition of his numerous contributions to the progress of science (see also *CI*, 1983, No. 3, pp. 2 and 18).

We regret to record the death of:

Prof K. Schäfer, FRG (30 July 1984) — Commission on Thermodynamics and Thermochemistry (1955–69).

Prof G. M. Schwab, FRG (25 December 1984) — President, Physical Chemistry Division (1961–65), Committee on Teaching of Chemistry (1964–73).

Prof H. Suomalainen, Finland (10 January 1985) — President of Applied Chemistry Division (1977–81), Bureau (1969–77), Commission on Biotechnology (1959–73).

IUPAC-SPONSORED CONFERENCES

Details available on IUPAC-sponsored conferences are given below. The latest brochures are available from the organizers listed on pp. 38–39.

International Symposium on Bio-organic Chemistry

New York City, NY, USA, 6–8 May 1985

The scientific sessions of the Symposium will be held in the Barbizon-Plaza Hotel, New York. Each of the three days of the Symposium has been allocated to one of the principal areas of bio-organic chemistry —

- A. Mimics of biological systems.
- B. Chemistry of natural products of biological importance.
- C. Chemistry of biological macromolecules.

Eight session lectures (40 min) have been arranged for each of these themes. There are also two evening poster sessions. The invited session lectures for the three themes will be:

- A. Attempted chemical construction of artificial single cells (I. Tabushi, Japan)
Host-guest complexation chemistry (D. Cram, USA)
Recent advances in supramolecular chemistry (J.-M. Lehn, France)
Sequence specific DNA cleaving molecules (P. Dervan, USA)
Approaches to artificial enzymes (R. Breslow, USA)
Organization and functions of synthetic bilayers (T. Kunitake, Japan)
Recent studies on enzyme models (T. Bruice, USA)
Synthetic models of metalloenzymes (J. T. Groves, USA)
- B. Chemistry of corphinoids (A. Eschenmoser, Switzerland)
Stereochemical studies of natural products biosynthesis (D. Cane, USA)
Biosynthesis of the pigments of life (A. R. Battersby, UK)
Studies on terpene biosynthesis (D. Arigoni, Switzerland)
Chemistry of metalloanthocyanins (T. Goto, Japan)
NMR studies of biosynthetic pathways (A. I. Scott, USA)
Studies on the biosynthesis of penicillin (J. E. Baldwin, UK)
Molecular messengers among insects (J. Meinwald, USA)
- C. Mechanistic study of enzyme-catalyzed redox reactions (C. Walsh, USA)
Phosphorothioate groups in DNA for enzymatic and structural studies (F. Eckstein, FRG)
The mechanism of action of enzymes catalyzing group transfer processes (S. J. Benkovic, USA)
Analysis of enzyme structure and activity by protein engineering (A. Fersht, UK)

The design of peptides and proteins (E. T. Kaiser, USA)

Biochemical asymmetric catalysis (C. J. Sih, USA)

Relatives of Watson-Crick DNA, RNA cross sections (N. J. Leonard, USA)

Studies on bacteriorhodopsin and visual pigments (H. G. Khorana, USA)

The registration fee is US\$100 (students US\$10) and you can register at the hotel on the day of the conference at no extra charge.

Cosponsor of the Symposium is the New York Academy of Sciences, one of the oldest scientific societies in America. It was founded in 1817 as the Lyceum of Natural History in the City of New York and its first endeavours led to the formation of a comprehensive scientific library and a museum (cabinet) of natural history specimens. The latter was destroyed in a disastrous fire in 1866 in one of the temporary locations of the Lyceum. The organization changed its name to the New York Academy of Sciences in 1876 and at last found a permanent home, 2 East 63rd Street, in 1950. Membership has grown from 747 in 1938 to more than 47 500 today, organized into five Divisions: Behavioral Sciences; Biological Sciences; Engineering Sciences; Physical Sciences; Interdisciplinary Sciences.

International Conference on the Theory of the Structures of Non-crystalline Solids Bloomfield Hills, Michigan, USA, 3–6 June 1985

The Conference is designed to provide an interdisciplinary forum for the discussion of new ideas in its broad and rapidly-evolving subject. To this end, the main topics will include:

Modelling the structures of non-crystalline solids, including both continuous random network models for chemically ordered systems, and random packing models for amorphous metals and metal-metalloid alloys

Chemical approaches using ideas such as local structure, bonding configurations, topology and defects

Numerical techniques such as the equation-of-motion and recursion methods

Cluster calculations utilizing the techniques of quantum chemistry

Curved space descriptions

Localization

Dynamic simulations using methods such as Monte Carlo and Molecular Dynamics
Comparisons between theory and experiment.

The scientific sessions will be held at the Institute for Amorphous Studies and will comprise ten plenary lectures, oral presentations of contributed papers and possibly also poster presentations. There will be no parallel oral presentations. The official language of the Conference is English and the registration fee is US\$175. An advantageous special group rate has been arranged for participants staying at the Kingsley Inn, buses being provided to the Institute.

The Institute for Amorphous Studies was founded in 1982 by Energy Conversion Devices, Inc, on a 10-acre site in Bloomfield Hills. It formalizes the study and research in amorphous materials for graduate students, postdoctoral fellows and others in the field; courses are offered to those in technical

areas who wish to increase their knowledge of amorphous materials and devices. Monographs on the physics, chemistry and electronic aspects of amorphous materials are published by the in-house Amorphous Institute Press. The Institute cooperates not only with Michigan universities but also with other academic centres throughout the world.

Bloomfield Hills is a beautiful semi-rural northern suburb of Detroit. The most interesting attraction in Bloomfield Hills (and in all of southern Michigan) is the Cranbrook Educational Community which had its origins in a 300-acre farm bought by George Booth, a newspaper publisher, in the early 1900s who named it after the English village of Cranbrook. Over the years the Booths transformed the farm into a magnificent estate including the Academy of Art, Institute of Science and the Cranbrook Schools, all designed by the Finnish architect Eliel Saarinen. An excursion to the Community will be available during the Conference.



The Institute for Amorphous Studies (photo courtesy of Energy Conversion Devices, Inc, Corporate Communications Department).

5th International Conference on Surface and Colloid Science Potsdam, New York, USA, 24–28 June 1985

Full details of the Conference are not available at the time of going to press. We do know, however, that it is being organized at the Institute of Colloid and Surface Science at Clarkson College of Technology, Potsdam. There will be two *plenary lectures*:

Cells and proteins on fluorocarbon–water interfaces (I. Giaever, USA)

The dynamics of wetting (P.-G. de Gennes, France)

In addition, there are two special lectures by outstanding members of the chemistry faculty of

Clarkson College. These are —

A colloidal cylinder as a model for light emitting tunnel junctions (M. Kerker)

and

Metal catalyzed oxidation of polymers with special references to polyethylene and isotactic polypropylene (H. H. G. Jellinek)

— which will introduce two of the special topics on the programme (Colloidal optics and spectroscopy and Spectroscopic studies of polymer–metal interfaces, respectively).

The Conference will be organized in three main themes — Dispersions, Interfaces, Biocolloids and Biosurfaces — each of which is subdivided into five or more specialized topics.

7th International Symposium on Plasma Chemistry

Eindhoven, Netherlands, 1–5 July 1985

The Symposium (ISPC-7) itself actually starts on 2 July, being preceded by a Workshop on Industrial Developments. Also starting on 1 July is an Exhibition, of equipment, parts, materials and processes, which is planned to be open throughout the Symposium. The scientific programme of the Symposium comprises plenary lectures, topical lectures on specialized subjects and over 150 papers in oral or poster form. It is designed to cover all aspects of plasma chemistry, plasma physics and plasma processing.

emphasis on laser techniques (R. W. Dreyfus, R. Walkup and J. Jasinski, USA)

Present state of plasmachemical conversion of coal (H. Drost, GDR)

State of the art in the field of plasma spraying and of extractive metallurgy with transferred arc: modelling, measurements, comparison between both, applications and developments (P. Fauchais, France)

Melting and refining of metallic ferroalloy fines (P. M. Cowx and C. P. Heanley, UK)

Basic reactions and kinetics in plasmas (W. Lindinger, Austria)

Deposition and ablation of organic films in low temperature plasmas (S. Morita, Japan)



Philips Congress Centre, Eindhoven.

The *invited lectures* expected to be given are:

Mechanism of etching, polymerization and deposition in RF discharges (R. D. d'Agostino, Italy)

Progress in thermal plasma deposition in alloys and ceramics fine particles (K. Akashi, Japan)

Progress in the applications of plasma surface modifications and correlations with the chemical properties of the plasma phase (J. Amouroux, France)

Production and study of beams of molecular fragments; some elementary processes (F. A. Baiocchi, USA)

Review of plasma deposition applications: Preparation of optical waveguides (P. Bachmann, FRG)

The plasma physics of plasma etching (Th. Bischofs and F. J. de Hoog, Netherlands)

Inductively coupled RF plasmas (M. Boulos, Canada)

Survey of diagnostics of low pressure plasmas with

Heat and momentum transfer to particles in thermal plasma flows (E. Pfender, USA)

Energetics of dissociation in plasma chemistry (B. M. Smirnov, USSR)

Elementary processes in plasma surface interactions with emphasis on ions (P. C. Zalm, Netherlands)

The official language will be English.

The Workshop, Exhibition and Symposium will all be held in the Philips Congress Centre, located in the middle of Eindhoven. Three adjacent hotels are recommended for participants, two operating special rates as is a motel in the southern outskirts.

As one of the aims of ISPC-7 is stimulation of contacts between engineers and scientists active in the field of plasma chemistry with manufacturers, there is a combined fee for Workshop, Exhibition and Symposium. Registration before 16 May 1985 costs Dfl. 500 but the registration fee after 15 May and at the conference desk will be Dfl. 650. These fees include lunches and a copy of the Symposium proceedings.

Eindhoven is situated in pleasant rural surroundings and lies within easy reach of a number of well-known old cities like Cologne, Dusseldorf, Maastricht, Brussels, Antwerp, Delft, Utrecht and Amsterdam.

28th Prague Microsymposium on Macromolecules: Polymer Composites Prague, Czechoslovakia, 8–11 July 1985

The Symposium programme is designed to include: theoretical and experimental studies on the structure–property relationships of fibre- or particulate-reinforced polymer composites; advances in test methods for the characterization of the matrix, interface and composite properties; and desired areas of basic research in the chemistry and physics of polymer composites. It is not intended that epoxy composites nor polymer blends, interpenetrating networks, etc. should be discussed in detail as these will be the subjects for other symposia in the series. The discussions are to be centred around the following five topics:

1. Mechanical properties of polymer composites: theory and reality.
2. The interface and the polymer matrix: structure, properties and environmental durability.
3. Polymer composites with enhanced toughness, impact and fatigue resistance.
4. Hybrid composites and hybrid matrices: synergistic effects.
5. Testing, processing and new applications of polymer composites.

These topics will be covered by invited main lectures (40 min), short special lectures (20 min) and poster presentations.

The *invited main lectures* to be given are:

- Problems of chemistry and physics of plastic flow in composites (N. S. Enikolopyan, USSR)
- Some principles of the formation and application of special polymer composites (H. Frommelt, GDR)
- Polymer–polymer composites: A historical perspective (J. C. Halpin, USA)
- Critical issues in achieving desirable mechanical properties for short fiber composites (J. L. Kardos, USA)
- Hybrid binders in polymer composites: Peculiarities of the structure depending on the mechanism of microphase separation (J. S. Lipatov, USSR)
- Interfacial effects in composites (J. A. Manson, USA)
- Processing of composite structures (L. Nicolais, Italy)
- The relation between interface failure and mechanical properties of fibre composites (M. R. Piggott, Canada)



Institute of Macromolecular Chemistry, Prague.

Ultra high modulus polyethylene composites
(I. M. Ward, UK)

Characterization of toughened polymers using
fracture mechanics (J. G. Williams, UK)

The working language of the Symposium is English and summaries of all lectures and poster contributions in the programme booklet will be in English.

Accommodation is being reserved in the 'Kajetánka' halls of residence, within easy reach, by public transport, of the Institute of Macromolecular Chemistry — in which all sessions of the Symposium will be held. The registration fee for active participants is US\$95 but a surcharge of US\$15 will be charged for applications after 15 March 1985. Reduced rates are available for certified full-time students.

The Institute of Macromolecular Chemistry was formally founded in 1959 and came into full operation in 1963. It is a part of the Czechoslovak Academy of Sciences (founded 1952) which is responsible for research in the Natural, Technical and Social Sciences. The Institute itself is responsible for scientific research in polymer chemistry, physical chemistry and physics (pure science), but always bearing in mind possible medical, domestic and industrial applications (applied science). A good example of this work is provided by the development of soft contact lenses, invented by Prof O. Wichterle, the first Director of the Institute. Other important activities of the Institute are the postgraduate education of young scientists (in parallel with the Universities), the organization of scientific meetings and the scrutiny of scientific programmes.

**3rd International Symposium on
Organometallic Chemistry directed toward
Organic Synthesis**
Kyoto, Japan, 12–15 July 1985

The scientific sessions of the Symposium will be held in the Silk Hall of the Kyoto Sangyo Kaikan, in the centre of Kyoto, which can be reached from the Metro stations via an underground passage. Accommodation in Kyoto has been arranged at special rates in six hotels either within walking distance or conveniently reached by Metro.

The scientific programme consists of invited lectures, oral communications and poster presentations; the official language is English.

The *invited lectures* to be given are:

Palladium catalyzed coupling of organotin reagents with organic electrophiles (J. K. Stille, USA)

Organoboron compounds in new synthetic reactions (A. Suzuki, Japan)

Directed asymmetric synthesis with boronic esters (D. S. Matteson, USA)

Complex reducing agents: Their applications and their outcomes in the field of carbonylations (P. Caubère, France)

Asymmetric induction in acyclic systems utilizing metal compounds (K. Narasaka, Japan)

Application of metals dispersed on graphite in organic synthesis (A. Umani-Ronchi, Italy)

Selective reactions using organotitanium reagents (M. T. Reetz, FRG)

The activation of carbon–hydrogen bonds by transition metal centres (M. L. H. Green, UK)

Asymmetric catalytic hydrogen migration of functionalized allylic compounds (K. Tani, Japan)

Chemistry of organopalladium and nickel complexes related to organic synthesis (A. Yamamoto, Japan)

Use of enolsilanes and allylsilanes for the diastereoselective formation of carbon–carbon bonds (C. H. Heathcock, USA)

Recent advances in arene transformation reactions *via* chromium complexes (E. P. Kündig, Switzerland)

Organic reactions induced by lanthanides reagents or catalysts (H. B. Kagan, France)

Catalytic asymmetric synthesis of cyclopropanecarboxylic acids. An application of the chiral copper carbenoid reaction (T. Aratani, Japan)

Cobalt mediated steroid synthesis (K. P. C. Vollhardt, USA)

Selective carbon–carbon bond formation based on organosilicon reagents: Origin and application (H. Sakurai, Japan)

New organometallic reactions useful for organic synthesis (G. W. Parshall, USA)

Catalytic amination of olefins (G. P. Pez, USA)

Transition metal carbonyl oestrogen receptor assay (G. J. Jaouen, France)

Copper-catalysed additions to olefins: A versatile synthetic tool (D. Bellus, Switzerland)

Recent biosynthetic investigations (J. E. Baldwin, UK)

July in Kyoto is usually hot (25–32°C) and humid (75% RH). Casual clothing is recommended, jackets and ties are not necessary even at the Symposium banquet — there will, in fact, be an official T-shirt on sale.

Although the Symposium officially ends at 15.30 on Monday afternoon, why not stay two more days and see the Gion Festival, a parade of decorated floats having its origin in the 9th Century? It will also give you yet another opportunity to look round Kyoto, the ancient capital of Japan.



Gion Festival, Kyoto.

**7th International Symposium on Solute–
Solute–Solvent Interactions**
Reading, UK, 15–19 July 1985

The Symposium will be held at the University of Reading and will have four main themes:

1. Fundamental and applied aspects of naturally-occurring electrolyte solutions (natural waters, brines, etc.).
2. Structural determination of the properties of liquids and solutions (molecular dynamics, scattering studies, Monte Carlo methods and spectroscopic studies).

The programme includes, for each of these themes, a plenary lecture, two session lectures, contributed



Whiteknights Hall, University of Reading (photo courtesy of University of Reading).

papers and posters. The official language is English. The *plenary lectures* to be given are, in 'theme order':

- Aqueous solutions related to the production and upgrading of heavy oils and bitumens (L. G. Hepler, Canada)
- Ionic hydration by neutron diffraction (J. E. Enderby, UK)
- Local order due to electrostatic interactions (P. Laszlo, Belgium)
- Conductance and diffusion theories for dilute solutions (J.-C. Justice, France)

The pairs of *session lectures* for each theme will be:

- The physical chemistry of natural waters (F. J. Millero, USA)
- Experimental and theoretical investigation of aqueous solutions at high temperatures (R. H. Wood, USA)
- Molecular dynamic simulations of aqueous electrolyte solutions (K. Heinzinger, FRG)
- Theoretical studies of aqueous solution structure (P. J. Rossky, USA)
- Aqueous mixtures to super-critical temperatures and at high pressures (E. U. Franck, FRG)
- Solvent effects on reaction rates (M. Abraham, UK)
- Transport properties of concentrated non-aqueous electrolyte solutions (of technological interest) (J. Barthel, FRG)
- Insights into solute-solute-solvent interactions from transport property measurements with particular reference to methanol-water mixtures and their constituents (L. A. Woolf, Australia)

Accommodation will be available in Whiteknights Hall, a University Hall of Residence but participants may, of course, stay in hotels in Reading. The registration fee, before 1 May 1985, is £60. If space permits, late registrations will be accepted but the fee in these cases will be £80.

Reading is a prosperous, rapidly developing town, about 65 km west of London, at the centre of England's 'Silicon Valley'. To the north are the beautiful wooded Chiltern Hills and the more open Berkshire Downs. It is within 50 km of Windsor, Oxford and Winchester. The weather in July should be warm and sunny, with an average daily temperature range from 12°C to 22°C but be prepared for rain.

5th International Symposium on Novel Aromatic Compounds St Andrews, UK, 15-19 July 1985

The Symposium (ISNA 5) will take place at the University of St Andrews, Scotland, and will cover all aspects of novel aromatic compounds. There will be 19 invited lectures; contributed papers will be in the form of poster presentations. English is the official language.

The *invited lectures* expected to be given are:

- Ab initio* molecular orbital studies of small-ring systems (L. Radom, Australia)
- The synthesis of Dewar furans and their benzo analogues (R. N. Warrener, Australia)

- Comprehensive molecular orbital study of the annulenes (R. C. Haddon, USA)
- Cyclobutadiene radical cations and 2-azapyrylium ions (H. Hogeveen, Netherlands)
- Walking-tour around the C_4H_4 potential surface (G. Maier, FRG)
- The synthesis and characterization of cyclazines and related *N*-bridged annulenes (D. Leaver, UK)
- Hyperconjugation: Characterization of π -effects of saturated substituents on aromatic rings (J. Michl, USA)
- High-spin polycarbenes as a model for organic ferromagnets (H. Iwamura, Japan)
- A fusion of metals, cyclophanes and dihydropyrenes (R. H. Mitchell, Canada)
- Structure, energy and aromaticity (R. F. Childs, Canada)
- N*-bridged annulenes (W. Flitsch, FRG)
- [2_n] Cyclophanes (V. Boekelheide, USA)
- Multi-electron (12π – 22π) pericyclic processes (H. Prinzbach, FRG)
- Synthetic and spectroscopic investigations of fulvenes and fulvalenes (M. Neuenschwander, Switzerland)
- The chemistry of carbocyclic and heterocyclic 10π aromatic systems (C. W. Rees, UK)
- Novel polycyclic conjugated compounds containing eight-membered ring(s) (M. Oda, Japan)
- Novel π -structures via electron transfer processes — from spectroscopy to synthesis (K. Müllen, FRG)
- Cyclic homoconjugation: New insights from new compounds (L. T. Scott, USA)
- Cruciaromaticity in organometallic compounds (M. J. S. Dewar, USA)

Accommodation will be available at the University. Hotel accommodation is also available but is limited in July. The weather is expected to be pleasantly warm — with longer hours of daylight than many people are used to — but rain is always a possibility. The registration fee, due by 3 June 1985, is £92. Late fee £102.

St Andrews is an historic and attractive small city (population ~12 000) situated on the East coast of Scotland some 55 miles north of Edinburgh. Before the reformation it was the ecclesiastical centre of Scotland and the site of the Scottish archbishopric. The University of St Andrews owes its foundation, in 1410, to this presence of the Church. It is the oldest university in Scotland and the third oldest in Britain. St Andrews was one of the centres of the reformation; among the staff of the University at this period were John Knox and George Buchanan.

Many reminders of these early days exist, such as the Chapels of the Colleges of St Salvator and St Leonard. (An organ recital during *ISNA 5* takes place in the former.) The whole University and city are embedded into one another to make a true university town, and ancient and modern buildings of the University and town sit cheek by jowl with one another. The present chemistry building and the Hall in which participants of *ISNA 5* will stay look out across the famous Old Course and St Andrews Bay.



North Street, St. Andrews.

Natural philosophy was taught in St Andrews from the earliest days of the University. Distinguished scientists who worked in St Andrews were the mathematician Napier and the astronomer Gregory. The teaching of chemistry as a subject began in 1811. A legacy for a chair of chemistry was also created in 1811, but the first professor of chemistry was not appointed until 1840. One distinguished chemist who emerged from the early classes was Dr Lyon Playfair who became professor of chemistry at Edinburgh and was one of the founders of the Chemical Society.

A crucial point in the story of chemistry in St Andrews was reached with the appointment of Thomas Purdie as professor in 1884. In his inaugural lecture he suggested that '... among all methods of scientific training there is none of such high educational value as research ...'. He followed these words with action by presenting the University with a laboratory in 1891, and followed this up in 1905 with another entirely new building for chemical research. Later he also provided a very large endowment which still to this day supports research in the department. It is thus not surprising that when the present chemistry building was completed in 1968 it was called The Purdie Building.

Purdie's research interests centred on optical resolution and he achieved a resolution of lactic acid *via* its zinc ammonium salt. His most significant contribution to chemistry was however the Purdie methylation reaction. In the hands of his student and successor Irvine this revolutionized carbohydrate chemistry and was the origin of the renowned carbohydrate School of Chemistry, which in the first quarter of this century made St Andrews world famous. From this school came such

famous chemists as W. N. Haworth and E. L. Hirst.

When Irvine was appointed Principal of the University in 1920 he was followed in the chair of chemistry by Robert Robinson, then at the height of his powers. The output of work at this time from what was a small department was prodigious. Of particular relevance to *ISNA 5*, it included the concept by Armit, who was the son of a local baker and pastrycook, and Robinson of the aromatic sextet. Robinson was followed as professor of organic chemistry in St Andrews by, in turn, John Read, John Cadogan and John Tedder, and has remained an active centre of organic chemistry.

It is highly appropriate that the fifth meeting on novel aromatic compounds should be held in St Andrews on the diamond jubilee of the publication of the concept of the aromatic sextet.

6th International Symposium on Mycotoxins and Phycotoxins Pretoria, RSA, 22–25 July 1985

The Symposium will be held at the CSIR Conference Centre on the eastern outskirts of Pretoria. The scientific programme will be presented in ten main themes designed to cover all aspects of mycotoxin and phycotoxin research. Thirteen plenary lectures (1 hour) and 44 section lectures (30 mins) will be presented, the latter in two-stream parallel sessions. All contributed papers will be in the form of poster presentations. The official language of the Symposium will be English.

The *plenary lectures* to be presented are:

- Synthetic studies on fungal metabolites (G. H. Büchi, USA)
- Regulation of secondary metabolism in fungi (A. L. Demain, USA)
- Sampling procedures for the analysis of mycotoxins (J. W. Dickens, USA)
- Biological background to the toxigenic anamorphs (B. Kendrick, Canada)
- Biochemical mechanism of action of mycotoxins (K.-H. Kiessling, Sweden)
- Marine phycotoxins (R. E. Moore, USA)
- Pathology of mycotoxins: possibilities and limits of a diagnosis (H. B. Schiefer, Canada)
- Synthesis of biologically active cyclopeptides from fungi, plants and sea animals (U. Schmidt, FRG)
- Recent structural studies on mould metabolites (Ch. Tamm, Switzerland)
- Progress towards a biosynthetic rationale of the aflatoxin pathway (C. A. Townsend, USA)
- Toxicology of naturally occurring microbial toxins (Y. Ueno, Japan)
- Determination of mycotoxins (H. P. van Egmond, Netherlands)
- Biosynthetic studies on some polyene mycotoxins (R. Vleggaar, RSA)

In addition, the Symposium opening ceremony will include a keynote address — Global significance of mycotoxins — by C. W. Hesseltine (USA) and a closing address by A. E. Pohland (USA) — Mycotoxin overview.

The themes under which the section lectures will be given are:



CSIR Conference Centre, Pretoria.

Mycology of toxin-producing fungi and the phy-
 cology of toxin-producing algae
 Basic aspects of secondary metabolism in relation
 to toxin production
 Biosynthesis of mycotoxins and phycotoxins
 Synthesis of mycotoxins and phycotoxins
 Structure and chemical properties of mycotoxins
 and phycotoxins
 Analysis of mycotoxins and phycotoxins
 Biochemical mechanism of action of mycotoxins
 and phycotoxins
 Pathology of mycotoxins and phycotoxins
 Naturally occurring toxicants in human and
 animal health

The registration fee, paid before 1 May 1985, is
 R150 but a surcharge of R50 will be applicable after
 this date. The fee includes transport between
 appointed hotels and the Conference Centre, lun-
 cheons and teas. It is recommended that intending
 participants check requirements for visas and health
 documents.

Although July is winter in South Africa, wet and
 humid weather is unlikely in Pretoria, mild and
 sunny days being expected with 19°C as average
 temperatures. The nights, however, are cold (about
 3°C). Accommodation is being arranged in two
 Pretoria hotels at special rates and transport to the
 Conference Centre will be available from there.

10th International Congress of Heterocyclic Chemistry Waterloo, Ontario, Canada, 11–16 August 1985

The Congress will take place at the University of
 Waterloo and is concerned with all aspects of
 heterocyclic chemistry, academic and industrial.
 The scientific programme will include plenary lec-
 tures, specialist symposia, contributed papers and
 poster sessions.

Plenary lectures to be presented are:

Synthetic aspects of the chemistry of silylthiazoles
 and silyloxazoles (A. Dondoni, Italy)
 Recent progress on asymmetric synthesis utilizing
 C-4 chiral thiazolidine-2-thione (E. Fujita,
 Japan)
 Design and study of new reagents for heterocyclic
 synthesis (L. Ghosez, Belgium)
 Heterocycles as building blocks and auxiliaries in
 synthesis (H. W. Gschwend, USA)
 Novel approaches and strategies in the total
 synthesis of biologically important hetero-
 cyclic systems (S. Hanessian, Canada)
 Synthesis via isoxazolines: Old concepts and
 recent results on stereoselection at isoxazoline
 ring and adjacent centres (V. Jäger, FRG)
 Macroheterocycles designed for catalysis (R. M.
 Kellogg, Netherlands)

New strategies for the stereocontrolled total
 synthesis of azacyclic natural products (L. E.
 Overman, USA)

New applications of dipolar cycloaddition
 chemistry toward the synthesis of heterocycles
 (A. Padwa, USA)

Synthetic endeavours involving β -lactam deriva-
 tives (R. J. Stoodley, UK)

The 'Heterocyclic Dimension' of bridged
 annulene chemistry (E. Vogel, FRG)

There will also be a lecture by T. Kametani (Japan),
 the recipient of the 3rd International Award in
 Heterocyclic Chemistry.

The special symposia have the following themes:

Novel heterocycles in pharmaceuticals
 Heterocyclic agrochemicals
 Metalation of heterocycles
 Heterocycles in stereoselective reactions
 R. H. F. Manske Symposium (Current trends in
 natural product chemistry)
 Cycloadditions in heterocyclic chemistry
 Novel heterocyclic structure and reactivity
 Bioorganic chemistry of heterocyclic systems
 X-ray crystallographic studies of biologically
 active heterocycles

Accommodation on the University campus is
 encouraged but there are hotels within 10 km if
 preferred. Registration by 1 June 1985 is Can\$155,
 after that Can\$185.

7th International Symposium on Cationic Polymerization and Related Processes Jena, GDR, 12–15 August 1985

The Symposium will take place in the lecture rooms
 of the Department of Chemistry of the Friedrich
 Schiller University of Jena. It will continue the
 tradition of cationic symposia started in the early
 fifties but will be extended to include the
 mechanistically similar anionic and complex
 coordinative polymerizations. It is hoped to include
 the following topics in the Symposium programme:

Cationic polymerization of olefins and other vinyl
 compounds
 Cationic ring-opening polymerization
 Initiation processes in cationic polymerization
 Reaction control of propagation in cationic
 polymerization
 Cationic copolymerization
 Sequential copolymers by cationic techniques
 Polymer modification and degradation by cationic
 processes
 New developments in anionic polymerization
 Diene polymerization
 Progress in ionic-coordinative polymerization

Main lectures expected to be given will include:

Copolymer synthesis using the activated mono-
 mer technique (E. Franta, France)

Cationic degradation of polyalkylene sulfides (E. J. Goethals, Belgium)

Complexes of Lewis-acids in cationic polymerization of olefins (V. Halaska, Czechoslovakia)

Theoretical investigations about the cationic propagation of vinyl monomers (P. Hallpap, GDR)

Controlled propagation in cationic vinyl polymerization (G. Heublein, GDR)

Carbocationic polymerization: Latest advances in macromolecular engineering (J. P. Kennedy, USA)

Cationic polymerizations involving activated monomers (St Penczek, Poland)

Regularities of cationic polymerization of substituted aziridines (V. A. Ponomarenko, I. A. Chekulaeva, I. V. Fonova, A. V. Ignatenko, USSR)

Polymerization of *N*-substituted lactams (R. Puffr, Czechoslovakia)

Ring-opening polymerization of nitrogen- and phosphorus-containing monomers — Polymerization mechanism and polymer properties (T. Saegusa, Japan)

Multiplicity of active centres in the cationic polymerization of *P*-methoxystyrene (G. Sauvet, France)

Living cationic polymerization of vinyl monomers: Mechanism and synthesis of new polymers (M. Sawamoto, Japan)

Some new examples of cationic ring-opening polymerization (R. C. Schultz, FRG)

Some problems of cationic polymerization of vinyl ethers (S. S. Skorokhodov, USSR)

The ways and means of forming and transforming the active centres in complex-coordinative polymerization (F. S. Dyachkovskii, USSR)

Polymerization of butadiene and styrene with Ziegler-Natta catalysts (K. Gehrke, GDR)

Synthesis of poly(substituted acetylenes) by transition metal catalysts (T. Higashimura, Japan)

Olefin polymerization with highly active soluble zirconium compounds using aluminoxane as cocatalyst (W. Kaminsky, FRG)

Determination of the number of active centres in Ziegler-Natta polymerization of olefins (J. Mejzlik, Czechoslovakia)

On the mechanism of polymerization of ethylene with supported metal organic compounds (J. Ulbricht, GDR)

The nature of active centres in the anionic polymerization of polar monomers (W. Berger, H. J. Adler, GDR)

Anionic ring-opening polymerization by alkali metal solutions (Z. J. Zedlinski, Poland)

Polyethylene oxide as a medium for anionic reactions (K. S. Kazanskii, USSR)

Functionalization of living polymers — Results and problems (L. Weber, GDR)

Other lectures, oral and poster communications are also allowed for, in parallel sessions if necessary. The official language of the Symposium is English. Registration forms and applications for



Old and new Jena. View of the University Tower from the market.

accommodation in the modern Hall of Residence should have been received by the organizers by 31 January 1985. The registration fee is US\$75 for active participants, payable in cash at the Organizing Office in Jena.

The city of Jena (population 104 000) lies in the north-eastern part of Thuringia, in the Saale valley. It is well known for its university and industries, especially the Carl Zeiss optical works. Places of interest include the 14th century Town Hall, the Main University Building, the Botanical Gardens, the Zeiss Planetarium, and the Schiller and Goethe Memorial. If you are considering walking round Jena, the weather should be warm (20–25°C) and sunny — but be prepared for showers.

30th International Symposium on Macromolecules

The Hague, Netherlands, 18–23 August 1985

The scientific programme of the Symposium, which will be held in the Netherlands Congress Centre, will include plenary lectures, invited lectures in each of the five microsymbiosia, short communications and poster sessions.

Plenary lectures to be given will include:

- Dynamic problems in the theory of polymer solutions (M. Fixman, USA)
- Concepts in polymer science. A half century in retrospect (P. J. Flory, USA)
- Cyclic imino ethers — Polymerization chemistry, polymer characteristics and application (T. Saegusa, Japan)

Solid state NMR — A tool for studying molecular motion in polymers (H. Sillescu, FRG)

The five microsymposia, and their associated *invited lectures*, will be:

1. Water-soluble Polymers.

Structure factors of polyelectrolyte solutions revealed by neutron scattering (G. Jannink, France)

Physical properties of DNA in solution (J. A. Schellman, USA)

2. Reactive Polymers.

Ion-exchange type resins in catalytic applications (E. Chiellini, Italy)

Polymer reagents: New reactive polymers based on nitrogen containing moieties (J. M. J. Frechet, Canada)

3. Polymers (at) Interfaces.

Synthetic membrane-active polyelectrolytes in the design of artificial immunogens and vaccines (V. A. Kabanov, USSR)

Surface forces with adsorbed polymers (J. Klein, Israel)

Microdomain formation in block- and graft-copolymer systems (G. Riess, France)

4. (Engineering) Materials.

Energy absorbing polymer-based composites (D. Hull, UK)

The science and technology of polymer blends (P. C. Juliano, USA)

5. (Di) Electric Properties.

Ferroelectric polymers and applications (F. Micheron, France)

A survey of structure and properties of polymers with metal-like conductivity (C. Wegner, FRG)

The programme will be arranged in such a way that lectures by invited speakers will not overlap. The official language of the Symposium is English.

The registration fee is Dfl.425 before 1 July 1985 and Dfl.550 after that date. The weather in August is usually pleasantly warm but can be rainy and overcast — be prepared.

The Hague ('s-Gravenhage, Den Haag) is the seat of the Dutch Government and of the International Court of Justice; the official residence of Queen Beatrix is also in the city, the Huis ten Bosch Palace. What other city has beaches and sand dunes as well as parks, canals, shops, government offices and Royal Palaces?

5th International Symposium on Marine Natural Products

Paris, France, 2–6 September 1985

The Symposium will be held in the lecture hall of the Centre National de la Recherche Scientifique. It will comprise eight plenary (1 hour) lectures, oral

communications (15 min) and poster presentations. The official languages are English and French and simultaneous translation from one to the other of these languages will be provided.

Plenary lectures expected to be given are:

Chemical defence in sponges (J. C. Braekman, Belgium)



Paris, quai A. France, venue of the Symposium.

Marine natural products of potential pharmacological and agricultural significance (J. H. Cardellina II, USA)
 Marine natural products: New results from Mediterranean invertebrates (G. Cimino, Italy)
 Pharmacologically active substances from Southern Pacific marine invertebrates (M. Endo, Japan)
 Synthetic studies on marine molecules (J. D. Martin, Spain)
 Molecular study of neurotoxic proteins isolated from the venom of sea- and land-snakes (A. Ménez, France)
 Title not yet announced (G. R. Pettit, USA)
 Study on terpenoids and steroids from some echinoderms and sponges (V. A. Stonik, USSR)

The Symposium fee is FF1000 and registration should be completed by 30 April 1985. Accommodation can be arranged in Paris hotels or in University student housing.

10th International Mass Spectrometry Conference Swansea, UK, 9–13 September 1985

The Conference will be held at the University College of Swansea, situated about 4 km to the west of the city centre and near to the seashore of Swansea Bay. Close to Swansea is the Gower Peninsula, an area of outstanding natural beauty.

The scientific programme will cover all aspects of mass spectrometry: theory, fundamental studies, applied studies and instrumentation. An important aim of the Organizing Committee is to provide during the Conference an environment which will stimulate the exchange of information between attending scientists. The campus at the University College of Swansea is small and the lecture rooms, poster rooms, exhibition hall, etc. are close to each other. Rooms will be put aside for discussions or informal seminars and several coffee bars will be open to delegates.

Within the scientific programme, plenary and keynote lectures will be presented by invited speakers. The plenary lectures (60 min) will be reviews of broad areas of activity in mass spectrometry. The keynote lectures (40 min) will be shorter and consist of specialized reviews. Other parts of the scientific programme will consist of contributed papers presented at either oral or poster sessions. The keynote lectures and oral contributions will be organized in three parallel sessions.

The *plenary lectures* to be given are:

The physical chemistry of ion reactions (P. J. Derrick, Australia)
 Applications of mass spectrometry in biochemistry, biomedicine, biology and pharmacology (E. C. Horning, USA)

Developments in the theory of mass spectrometry (J.-C. Lorquet, Belgium)
 Mechanistic aspects of organic mass spectrometry (H. Schwarz, FRG)
 Instrumentation in mass spectrometry (J. F. J. Todd, UK)

The *keynote lectures* will be:

Charge-stripping reactions of high-energy ions (T. Ast, Yugoslavia)
 Secondary-ion mass spectrometry (A. Benninghoven, FRG)
 Charge-permutation reactions (J. H. Beynon, UK)
 The influence of internal energy on unimolecular and bimolecular ion/molecule reactions (M. T. Bowers, USA)
 Negative ions (J. H. Bowie, Australia)
 GC/MS employed with chemical ionization sources for studies of positive and negative ions (A. P. Bruins, Netherlands)
 Mass spectrometry in geo- and cosmo-chemistry (I. Cornides, Hungary)
 Mass spectrometric studies at high temperatures using the Knudsen-cell method (J. Drowart, Belgium)
 Ionization methods in mass spectrometry (F. H. Field, USA)
 The combination of liquid chromatography and mass spectrometry (D. E. Games, UK)
 Quantitative mass spectrometry in the biomedical sciences (E. Gelpi, Spain)
 Analysis of inorganic solids and solutions by plasma-source mass spectrometry (A. L. Gray, UK)
 Stable isotopes in the life sciences (D. Halliday, UK)
 Stereo-electronic factors in mass spectrometry (V. Hanus, Czechoslovakia)
¹⁴C dating by mass spectrometry (R. E. M. Hedges, UK)
 Ion thermochemistry (J. L. Holmes, Canada)
 Low-energy ion/molecule reactions (K. R. Jennings, UK)
 Mass spectrometric studies of Halley's Comet (J. Kissel, FRG)
 Photodissociation of ions (K. Levsen, FRG)
 Fragmentation studies by means of translational spectroscopy (J. Los, Netherlands)
 Cluster ions (T. Märk, Austria)
 Tandem mass spectrometry (F. W. McLafferty, USA)
 Application of Fourier transform ion cyclotron resonance in ion chemistry studies (N. M. M. Nibbering, Netherlands)
 Desorption techniques in bio-medical and pharmaceutical research (J.-C. Promé, France)
 Investigation of the structures of large molecules with special reference to glycoconjugates (B. E. Samuelsson, Sweden)
 Ab-initio calculations on positive ions (P. v. R. Schleyer, FRG)
 Superaccurate determination of atomic masses by

ion cyclotron resonance (V. L. Tal'rose, USSR)

The official language of the Conference will be English.

The registration fee is £100 if paid by 30 June 1985, thereafter, including last-minute registration at the Conference, it is £110. The registration form, including deposits for accommodation, should be returned by 30 April 1985. Accommodation is available in modern University Halls of Residence, University houses (suitable for families) or nearby hotels.

It is expected that daytime temperatures will be around 20°C and the weather mostly pleasant, with the possibility of occasional showers.

The University College of Swansea, one of the constituent colleges of the University of Wales was founded in the 1920s. Currently, it caters for about 3800 students. It is located in parkland, facing the sea, on the site of Singleton Abbey (currently its Administrative Building), the home of the Vivian family who were producers of copper in the Swansea area in the last century. The Swansea area is still one of the major centres for the production of many ferrous and non-ferrous metals.



Swansea Bay and Mumbles Head.

United Nations Financing System for Science and Technology for Development (UNFSSTD)

UNFSSTD was created following a conference of 142 countries in Vienna in 1979 where plans were drafted to bring a mix of high and low technologies

to bear on the hard-core problems of poverty and low productivity in developing countries, plans which were endorsed by the UN General Assembly.

The 'System' receives funds from voluntary contributions, but it also has unique flexibility to finance half its activities in the Third World through trust funds, loan operations, equity participation and cofinancing.

It is under the umbrella of the United Nations Development Programme (UNDP) with direct access to the technical resources of UNDP's 115 field offices, and it executes projects through the UN system's agencies and governments. But it can also work through selected transnational corporations, universities and other private institutions when they are the best sources of technologies, training or advice.

It takes on high-risk research, experiments with new approaches, and develops productive North-

South links among research facilities. It also seeks a wider application of traditional technologies in developing countries and promotes a South-South exchange of science and technology.

It operates from an office in New York with a small staff, with links to other UN organizations, and has been able to hold its overhead costs to a remarkably low 5 per cent of its resources.

Over the past four years, UNFSSTD has backed some 86 science and technology projects in Asia, Africa, Latin America, the Arab States and the Caribbean, and results so far have demonstrated a potential for major dividends on relatively modest investments. But its budget so far is barely one-fifth of that targeted by the Vienna Conference.

Other People's Publications

European Photochemistry Association (EPA)

EPA Newsletter No. 22, November 1984. Photochemistry in Sweden. Report of the EPA General Assembly, July 1984. Article on *UV Dosimetry: Efficacy Units* reproduced from the *American Society for Photobiology Newsletter* No. 74, December 1983. Technical report: *Evaluation of the $A \rightleftharpoons$ photoreaction system when only A is known*. Lists of new books and theses on photochemistry and related subjects. Reports on: 10th IUPAC Symposium on Photochemistry, July 1984; NATO Advanced Study Institute — Excited Probes in Biochemistry and Biology, September 1984; 3rd Photochemistry Minisymposium, September 1984. Calendar of meetings 1985–86.

Federation of Asian Chemical Societies (FACS)

FACS Newsletter No. 2/1984, August 1984. Progress with the Asian Network for Analytical and Inorganic Chemistry. Synopses of IUPAC recommendations. Report on 'Priochem Asia 1984', the 2nd FACS Asian Chemical Conference, which had the theme Chemistry and the Environment. Reports on FACS Working Groups. Article by Dr M. S. Sambhi — *Chemical Education: Some Viewpoints*. Report on 2nd meeting of IOCD, Mexico, March 1984. News from Member Societies.

International Council of Scientific Unions (ICSU)

ICSU Newsletter No. 20, December 1984. Formation of an Ad Hoc Group (including T. S. West) to examine the needs for an inter-Union body on biotechnology. Article on the role of IUMS in biotechnology. Report on the annual meeting of the Steering Committee of the International Biosciences Networks, October 1984. Announcements of: the UNEP/WMO/ICSU meeting on the Role of Carbon Dioxide in Climate Variations and their Impact, Austria, October 1985; the Conference on the Results of the WMO–ICSU Global Weather Experiment and their Implications for the World Weather Watch, Geneva, May 1985. Article on the Earth's Environment and the Solar System. Statement by an Ad Hoc Group of ICSU/Inter-Faith Academy of Peace on nuclear war — its consequences and prevention. Article on the International Union of Geodesy and Geophysics (IUGG). Report on the meeting of COGENE, October 1984.

ICSU Scientific Committee on Problems of the Environment (SCOPE)

SCOPE Newsletter No. 22, September 1984. Acidification in tropical countries. The impact of an anthropogenic input of CO₂ in the environ-

ment. Report on the 4th ENUWAR Workshop, Leningrad, May 1984. Details of SCOPE Reports.

SCOPE Report 20: Methods for Assessing the Effects of Chemicals on Reproductive Functions

This xxvi + 541 page book, edited by V. B. Vouk and P. J. Sheehan, provides a review and assessment of the methods available for evaluating the toxicological effects of chemicals on the reproduction of living animals. The reproductive functions of both female and male mammals are examined in detail, including laboratory testing and epidemiology evaluations even though discussion of methods applicable to other vertebrates, non-vertebrates, higher plants and microorganisms is less detailed. Needs for further work are identified. The volume is in two main parts: the first is a joint report of a workshop in Italy, May 1981; the second part consists of 24 contributed papers.

The book is published by John Wiley & Sons Ltd, and costs about US\$44. ISBN 0-471-10538-4.

SCOPE Report 21: The Major Biogeochemical Cycles and Their Interactions

Since the mid 1970s SCOPE has been studying the global cycles of the major elements, and particularly the overall balance of the material fluxes due to water and air motion. This xxii + 532-page book, edited by B. Bolin and R. B. Cook, examines the interactions linking the biogeochemical cycles of carbon, nitrogen, sulphur and phosphorus in the major parts of the global system, i.e. the atmosphere, terrestrial biota, the soil, the freshwater system, coastal zones, the open sea and marine sediments. It is based on the proceedings of a workshop held in Sweden in 1981. The first chapter is an overview of the field as a whole and is followed by a summary of the main features of the four cycles. The remaining 17 chapters are revised forms of the papers presented at the workshop.

The book is published by John Wiley & Sons Ltd, at a price of about US\$72.50. ISBN 0-471-10522-8.

International Federation of Clinical Chemistry (IFCC)

IFCC News No. 38, 1984/3. Notes on the retiring and incoming Officers of IFCC. *Recent developments with ion selective electrodes.* Notes on four Congresses of interest to clinical chemists in Israel in 1985. *Interactions of drugs with clinical laboratory tests.*

IFCC Recommendations and Related Documents Volume 1, 1978–1983

This 146-page volume was edited by Prof N.-E.

Saris and published in 1984. There is an 8-page introduction which includes useful summaries on IFCC itself, the nature of IFCC documents and recommendations, the Expert Panels and the Education Committee — including their terms of reference. The next 119 pages are devoted to the compilation of IFCC documents and recommendations issued by the Expert Panels and include all references published in English. Owing to the close cooperation between the IFCC bodies and the Commissions of the IUPAC Clinical Chemistry Division, some of these documents have been published at various times in *PAC*. The value of this compendium in bringing all this information together is clear (*cf.* for example Division V's 'Orange Book') and it seems appropriate to give a full list of the contents of this section of the book:

Quantities and units in clinical chemistry

List of quantities in clinical chemistry

Quality control in clinical chemistry:

Part 1. General principles and terminology

Part 2. Assessment of analytical methods for routine use

Part 3. Calibration and control materials

Part 4. Internal quality control

Part 5. External quality control

Part 6. Quality requirements from the point of view of health care

Measurement of catalytic concentration of enzymes

Part 1. General considerations concerning the determination of the catalytic concentration of an enzyme in the blood serum or plasma of man

Specification for human serum albumin standard

The human serum standard IFCC 74/1

Guidelines (1984) for listing specifications of spectrometers

Guidelines (1984) for listing specifications of clinical chemical analysers

Evaluation of diagnostic kits

Part 1. Recommendation for specifications on labelling of clinical laboratory materials

Part 2. Guidelines for the evaluation of clinical chemistry kits

Summary of IFCC/WHO documents produced by the Expert Panel on evaluation diagnostic reagent sets

Reference method of pH measurement in blood

A scheme for a two year postgraduate course in clinical chemistry

The book ends with a bibliography of published IFCC documents and a list of authors. It is published by Walter de Gruyter, Berlin and New York. ISBN 3-11-008766-9.

IUPAC CONFERENCES

Additional information from address in parentheses

1985

Compounds of Transition Elements

April 9–13. 8th International Conference on Solid Compounds of Transition Elements. Vienna, Austria.

(Gesellschaft Österreichischer Chemiker, VIII SCTE, Eschenbachgasse 9, A-1010 Wien, Austria.)

Analytical Chemistry

April 15–19. 2nd International Symposium on Analytical Chemistry in the Exploration, Mining and Processing of Materials. Pretoria, Republic of South Africa.

(The Symposium Secretariat S.328, CSIR, Box 395, Pretoria 0001, Republic of South Africa.)

Bioorganic Chemistry

May 6–8. 1st International Symposium on Bioorganic Chemistry. New York City, NY, USA.

(The Conference Director, The New York Academy of Sciences, 2 East 63rd Street, New York, New York 10021, USA.)

Non-crystalline Order in Polymers

May 27–30. International Symposium on Non-crystalline Order in Polymers. Naples, Italy.

(Prof A. Sirigu, Dipartimento di Chimica, Università di Napoli, Via Mezzocannone 4, I-80134 Napoli, Italy.)

Non-crystalline Solids

June 3–6. International Conference on the Theory of the Structures of Non-crystalline Solids. Bloomfield Hills, Michigan, USA.

(Dr Martin C. Steele, Director, Institute for Amorphous Studies, 1050 East Square Lake Road, Bloomfield Hills, Michigan 48013, USA.)

Surface and Colloid Science

June 24–28. 5th International Conference on Surface and Colloid Science. Potsdam, NY, USA.

(Prof E. Matijević, Institute of Colloid & Surface Science, Clarkson University, Potsdam, NY 13676, USA.)

Polymer Composites

July 8–11. 28th Microsymposium on Macromolecules: Polymer Composites. Prague, Czechoslovakia.

(Mrs H. Konášová, Secretary, PMM Secretariat, Institute of Macromolecular Chemistry, Czechoslovakia Academy of Sciences, 1888 Petriny, Prague 616, Czechoslovakia.)

Organometallic Chemistry

July 12–15. 3rd International Symposium on Organometallic Chemistry directed toward Organic Synthesis. Kyoto, Japan.

(Prof R. Noyori, Department of Chemistry, Nagoya University (Rigaku-Bu), Nagoya 464, Japan.)

Aromatic Compounds

July 15–19. 5th International Symposium on Novel Aromatic Compounds. St Andrews, UK.

(Dr P. J. Garratt, Department of Chemistry, University College London, 20 Gordon Street, London WC1H 0AJ, UK.)

Interactions in Solution

July 15–19. 7th International Symposium on Solute–Solute–Solvent Interactions. Reading, UK.

(Dr T. M. Hardman, Department of Chemistry, The University of Reading, Whiteknights, Reading, Berkshire, RG6 2AD, UK.)

Mycotoxins and Phycotoxins

July 22–25. 6th International Symposium on Mycotoxins and Phycotoxins. Pretoria, Republic of South Africa.

(Miss Jill Sawers, CSIR Symposium Secretariat S351, Council for Scientific and Industrial Research, POB 395, Pretoria 0001, Republic of South Africa.)

Plasma Chemistry

July 1–5. 7th International Symposium on Plasma Chemistry. Eindhoven, Netherlands.

(Dr C. J. Timmermans, Department of Physics, Technische Hogeschool Eindhoven, PO Box 513, 5600 MB Eindhoven, Netherlands.)

Heterocyclic Chemistry

August 11–16. 10th International Congress of Heterocyclic Chemistry. Waterloo, Ontario, Canada.

(Ms Margaret Gerth, The Guelph–Waterloo Centre for Graduate Work in Chemistry, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.)

Hydrothermal Reactions

August 12–14. 2nd International Symposium on Hydrothermal Reactions. University Park, Pennsylvania, USA.

(Prof H. L. Barnes, Prof of Geochemistry and Director of Ore Deposits, College of Earth and Mineral Sciences, The Pennsylvania State University, 235 Deike Building, University Park, Pennsylvania 16802, USA.)

Cationic Polymerization

August 12–15. 7th International Symposium on Cationic Polymerization and Related Processes. Jena, German Democratic Republic.

(Dr R. H. Wondraczek, Sektion Chemie, Friedrich-Schiller-Universität, DDR-6900 Jena, German Democratic Republic.)

Macromolecules

August 18–23. 30th International Symposium on Macromolecules. The Hague, Netherlands.

(Dr J. A. M. Smit, Gorlaeus Laboratories, University of Leiden, Department of Chemistry, PO Box 9502, 2300 RA Leiden, Netherlands.)

Thermal Analysis

August 19–23. 8th International Conference on Thermal Analysis. Bratislava, Czechoslovakia.

(Dr O. Korab, The Organizing Committee of the 8th ICTA, c/o Slovak Technical University, 812 43 Bratislava, Czechoslovakia).

Chemical Education

August 23–28. 8th International Conference on Chemical Education: Widening the Scope of Chemistry. Tokyo, Japan.

(Prof J. T. Shimozaawa, Secretary General of 8-ICCE, c/o The Chemical Society of Japan, 1-5 Kanda-Surugadai, Chiyoda-ku, Tokyo, 101 Japan.)

Mathematics and Chemistry

September 2–5. International Symposium on Applications of Mathematical Concepts to Chemistry. Dubrovnik, Croatia, Yugoslavia.

(Prof Lj. Rušćić, Ruder Bošković Institute, PO Box 1016, Bijenička 54, YU-41001 Zagreb, Croatia, Yugoslavia.)

Marine Natural Products

September 2–6. 5th International Symposium on Marine Natural Products. Paris, France.

(Dr A. Ahond, Institut de Chimie des Substances Naturelles, CNRS, F-91190 Gif sur Yvette, France.)

Vapour–Liquid Equilibrium

September 5–7. 2nd International Workshop on Vapour–Liquid Equilibria in 1-Alkanol + *n*-Alkane Mixtures. Paris, France.

(Dr H. V. Kehiaian, Laboratoire de Chimie Organique Physique, Institut de Topologie et de Dynamique des Systèmes, Université Paris VII, 1 rue Guy de la Brosse, F-75005 Paris, France.)

Organometallic Chemistry

September 9–13. 12th International Conference on Organometallic Chemistry. Vienna, Austria.

(Prof K. Schlögl, Institut für Organische Chemie der Universität Wien, Währingerstrasse 38, A-1090 Wien, Austria.)

Mass Spectrometry

September 9–13. 10th International Mass Spectrometry Conference. Swansea, UK.

(Dr F. M. Harris, Royal Society Research Unit, University College of Swansea, Swansea SA2 8PP, UK.)

IUPAC Congress

September 9–13. 30th International Congress of Pure and Applied Chemistry. Manchester, UK.

(The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Spectroscopy

September 15–21. 24th Colloquium Spectroscopicum Internationale (CSI XXIV). Garmisch-Partenkirchen, Federal Republic of Germany.

(Dr J. Wendenburg, Gesellschaft Deutscher Chemiker, Carl Bosch-Haus, Postfach 900440, Varrentrappstrasse 40–42, D-6000 Frankfurt/Main 90, Federal Republic of Germany.)

Mössbauer Effect

September 16–20. International Conference on the Applications of the Mössbauer Effect. Leuven, Belgium.

(Prof R. Coussemant, Institut voor Kern- en Stralingsfysika, Celestijnenlaan 200 D, B-3030 Leuven, Belgium.)

Chemical Resources of the Ocean

September 23–27. Chemical Resources of the Global Oceans — CHEMRAWN IV. Massachusetts, USA. (J. R. Moore, Director, Marine Science Institute, University of Texas, Austin, TX 78712, USA.)

Medicinal Natural Products

November 10–14. International Symposium on Organic Chemistry of Medicinal Natural Products. Shanghai, China. (Prof Dai Lixin, Shanghai Institute of Organic Chemistry, Academia Sinica, 345 Lingling Lu, Shanghai 200032, China.)

1986

Synthetic Polymeric Membranes

July 7–10. 29th Microsymposium on Macromolecules. Prague, Czechoslovakia. (Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, CS-162 06 Prague 616, Czechoslovakia.)

Crosslinked Epoxides

July 14–17. 9th Discussion Conference on Macromolecules. Prague, Czechoslovakia. (Dr P. Čefelín, Scientific Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Heyrovského náměstí 2, CS-162 06 Prague, Czechoslovakia.)

Analytical Chemistry

July 20–26. SAC 86: International Conference on Analytical Chemistry. Bristol, UK. (Prof J. M. Ottaway, Department of Pure and Applied Chemistry, University of Strathclyde, Thomas Graham Building, 295 Cathedral Street, Glasgow G1 1XL, UK.)

Pesticide Chemistry

August 10–17. 6th International Pesticide Chemistry Congress. Ottawa, Canada. (Dr H. V. Morley, London Research Station, Agriculture Canada, University Sub-Post Office, London, Ontario, Canada.)

Natural Products

August 17–23. 15th International Symposium on the Chemistry of Natural Products. The Hague, Netherlands. (Dr G. J. Koomen, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, Netherlands.)

Physical Organic Chemistry

August 24–29. 8th IUPAC Conference on Physical Organic Chemistry. Tokyo, Japan. (Prof M. Oki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

REVISIONS TO IUPAC HANDBOOK

CI, 1984 Supplement

Additions and amendments to the *Handbook* between 28 November 1984 and 5 February 1985 are given below.

Additions, new entries, are marked with an asterisk. The affiliation of new members of IUPAC bodies is included.

Amendments are shown by # at the beginning of the line in which the revision occurs.

MEMBERSHIP LISTS OF IUPAC BODIES

NATIONAL ADHERING ORGANIZATIONS

Ireland

Royal Irish Academy, 19 Dawson Street, Dublin 2, Ireland
#(TEL: +0044 (0001) 762570/764222)

ASSOCIATED ORGANIZATIONS

European Photochemistry Association #Prof. F. WILKINSON (Chairman EPA),
#Department of Chemistry, Loughborough University of
#Technology, Loughborough, Leicestershire LE11 3TU, UK
#(TEL: +44 (509) 263171. TELEX: 34319 G)

International Association for Cereal Science and Technology #Dipl. Ing. H. GLATTES (Secretary General ICC),
ICC General Sekretariat, Schmidgasse 3-7,
A-2320 Schwechat, Austria
(TEL: 777202. TELEX: 133316 A)

International Association of Geochemistry and Cosmochemistry #Dr. B. HITCHON (Secretary IAGC),
#Alberta Research Council, 11315-87 Avenue,
#Edmonton, Alberta T6G 2C2, Canada

International Zeolite Association #Dr. D. E. W. VAUGHAN (President IZA),
#Exxon Research and Engineering Co.,
#Corporate Research, Science Laboratories,
#Clinton Township, Route 22 East,
#Annandale, New Jersey 08801, USA

COMMISSION ON THERMODYNAMICS (I.2) (Established in its present form 1977)

National Representatives

*Dr. R. Fernández-Prini (1984-1985)
Argentina

SUBCOMMITTEE ON LIQUID SOLUBILITIES

Members

*Prof. B. A. Wolf

#COMMISSION ON WATER CHEMISTRY (VI.6) #(Established in its present form 1983)

*Titular Members

*Prof. W. Eckenfelder (1983-1987)
*Mr. L. G. Lindfors (1983-1987)
*Prof. F. Malz (1983-1987)
*Dr. Nicole Strupler (1983-1987)
*Mr. J. A. Tetlow (1983-1987)

*Associate Members

*Dr. K. Trobisch (1983-1985)

ALPHABETICAL INDEX TO MEMBERS OF IUPAC BODIES

*CONACHER, Dr. H. B. S., Food Research Division, Health Protection Branch,
Health and Welfare Canada, Tunney's Pasture, Ottawa, Ontario K1A 0L2, Canada (32)
Associate Member VI.1 (1983-1987)

*ECKENFELDER, Prof. W., Department of Civil and Environmental Engineering,
Vanderbilt University, Nashville, Tennessee 37235, USA (34)

*FIGINI, Dr. R. V., Instituto de Investigaciones Fisicoquímicas,
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Deletions:

Dr. A. Cantafora (resigned) [p. 32, NR VI.1]

Prof. D. T. Clark (resigned) [p. 25, Member WP on Supported Polymer Films]

Prof. F. C. De Schryver [p. 5, Chairman EPA] (replaced by Prof. F. Wilkinson)

Dr. Sarah Deutsch [p. 6, Secretary IAGC] (replaced by Dr. B. Hitchon)

Dr. R. Fernández-Prini (resigned) [p. 30, NR V.8]

Prof. T. Juszkievicz (resigned) [p. 32, AM VI.1]

Dr. G. T. Kerr [p. 7, President IZA] (replaced by Dr. D. E. W. Vaughan)

Dr. K. Kühn (resigned) [p. 14, Rep. on IUPHAR Section on Toxicology; p. 36, AM VII.4; p. 37, Member SC on Environmental and Occupational Toxicology of Nickel]

Dr. H. J. Kretzschmar (resigned) [p. 25, Member WP on Supported Polymer Films]

Prof. W. Krönert (resigned) [p. 32, TM VI.1]

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CLINICAL CHEMISTRY DIVISION (VII)

COMMISSION ON TOXICOLOGY (VII.4)

<u>PROJECT TITLE</u>	<u>COORDINATOR</u>	<u>STARTING DATE</u>	<u>COMPLETION OR * REVIEW DATE</u>
1/85 Evaluation and Development of General Human Quality Insurance Products for Trace Element Analysis in Body Fluids	Y. Thomassen M. Stoeppler	1985	1987

Pure and Applied Chemistry

Official Journal of the International Union of Pure and Applied Chemistry

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The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary, non-governmental, non-profit association of organizations, each of which represents the chemists of a member country.

Its objectives are:

to promote continuing co-operation among the chemists of the member countries;

to study topics of international importance to pure and applied chemistry which need regulation, standardization, or codification;

to co-operate with other international organizations which deal with topics of a chemical nature;

to contribute to the advancement of pure and applied chemistry in all its aspects.

The membership of IUPAC presently comprises 44 countries, each represented by a national organization, such as an academy of science or research council.

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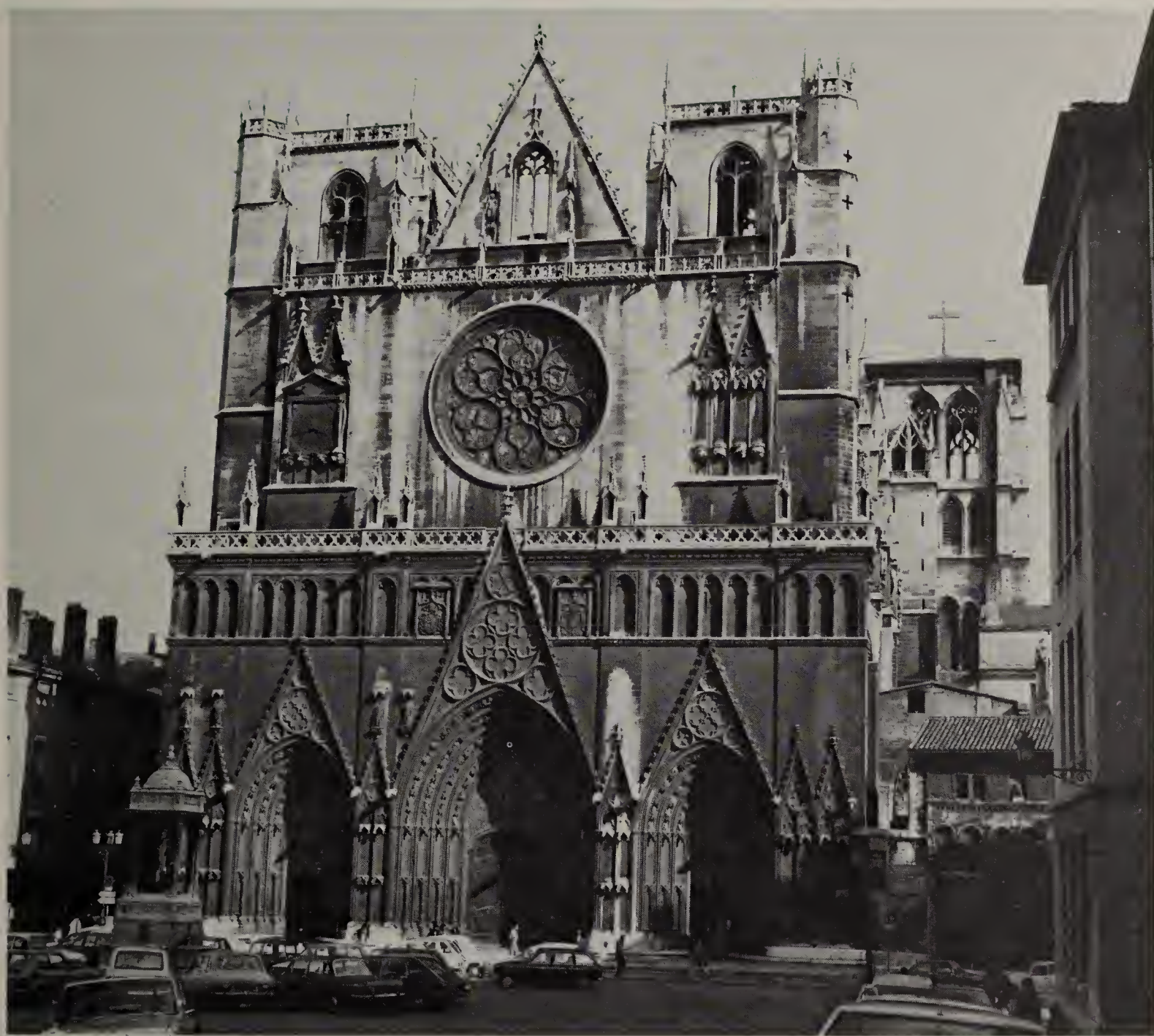
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Chemistry International

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)



CHEMISTRY INTERNATIONAL

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Reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original publication in *Chemistry International*, unless there is a footnote to the contrary.

Front cover: The cathedral of St John the Baptist, Lyon (*photo courtesy of the French Government Tourist Office*).

This is it, my last Editorial — Fennell's finale*. Those of you who glance at the inside cover will have seen two editors listed for this issue, which perhaps needs some explanation. By chance Dr Freemantle took up his duties only one day before the copy was due at the Publishers, so he could hardly be expected to have done much about it himself. Responsibility for the contents of this issue is therefore mine but that for how it finally appears is his.

We have rather more of a mixture for you this time than in the last issue, ranging from the purely IUPAC business through to an authoritative article on education in USSR by Profs Zaikov and Samoylova (pp. 12–21). Is it possible that the articles by Dr Leigh on the Periodic Table (pp. 26–27) and by members of Commission VII.2, on nomenclature of derived quantities (pp. 29–33), will result in some Letters to the Editor? Letters to the Information Officer (same man, actually) will be welcome to put right errors and omissions in the list on pp. 33–34, of IUPAC reports, published during 1984 — an impressive list indicating a lot of hard work. On the subject of reports, may I draw your attention to the guidelines prepared by Mr Gujral (p. 41)? I am particularly pleased in 'my' last issue not only to include a pen picture of another of our Division Presidents, this time Prof Bamford, but also an article on one more of our NAOs, that of Yugoslavia, written by one of my old Division V colleagues, Prof Kosta. Once again I have tried to give you a 'feel' for the General Assembly location, this time Lyon. You may remember that last time I took you on a guided tour of Copenhagen but I am afraid I got lost amongst the bridges of Lyon; in any case the local tourist information office do it very much better than I could.

And what about Revisions to the *IUPAC Handbook*? From a plot of number of pages against the consecutive issues from August 1984 to April 1985 I estimated that we should have 16 pages of revisions in this one. Actually there are 6, which only goes to show the danger of extrapolation!

*Defined, *inter alia*, in my dictionary as: The closing part of a drama or any other public entertainment. The end: the final catastrophe — *Editor*.

Thirty Years of the Union of Yugoslav Chemical Societies

As a result of preparatory actions started in 1950 the Coordinating Committee of National Chemical Societies decided at its 6th Session, in 1953, to form the Union of Chemical Societies of the Federal National Republic of Yugoslavia (UYCS). At its 1st plenary meeting in Ljubljana in 1955, Prof M. Samec (1881–1964), doyen of Slovene Chemistry, was elected President and Prof P. S. Tutundžić (1900–65), a prominent electrochemist from Belgrade, Secretary. The latter served as President in the 2nd mandate from 1962–65. Represented by their delegates in the Presidium and the Assembly of UYCS are the Chemical Societies of Croatia, Serbia, Slovenia and Vojvodina and the five Associations of Chemists and Technologists, namely those of Bosnia and Hercegovina, Croatia, Kosovo, Macedonia and Serbia.

Authority formally to represent Yugoslav chemists and technologists in IUPAC, and in other international organizations such as the Federation of European Chemical Societies, was transferred from the Council of Academies to UYCS in 1958. In the same year the Presidium decided to organize the 1st Conference of Yugoslav Chemists and entrusted the Chemical Society of Croatia with the arrangements. It was held in 1960 in Zagreb.

The UYCS publishes a synopsis journal with its Editorial Office in Zagreb. It was constituted on the initiative of Prof B. Težak (1907–80) who was also for many years its Editor-in-Chief as well as the Editor of *Croatica Chimica Acta*, and was the third President of the UYCS, from 1965–70. The Journal is at present appearing under the name *Yugoslav Chemical Papers* (Editor Mrs N. Pravdić) and contains the abstracts of papers from scientific journals of the constituent Societies. All five journals have the common subtitle *Documenta Chemica Jugoslavica*.

The Union operates through its nine Commissions, namely on Analytical Chemistry, Chemistry and Technology of Ceramics, Chemistry and Technology of Macromolecules, Corn and Flour, Education, Electrochemistry, Nomenclature and Terminology, Rare Metals, and Spectroscopy. The Commissions have their counterparts in Sections of the adhering Societies which are responsible for organization of Symposia in their specific fields. A committee is responsible for coordinating the programmes of different meetings. Another Committee, that for International Relations (Chaired by Prof P. Putanova, Novi Sad, Past-President of the UYCS) advises the UYCS assembly on actions



Acad. Prof M. Samec, one of the founders of Ljubljana University, Head of the Chemistry Department and a long-time President of the Slovene Chemical Society. He was also the first Director of the Boris Kidrič Institute.

involving cooperation at the international level.

In the 30 years of the existence of UYCS, seven Yugoslav Congresses on Chemistry and Chemical Technology and over a hundred symposia, workshops, summer schools and scientific sessions have been organized (in part jointly with the Association of Yugoslav Chemists and Chemical Technologists, another large professional society in the country) by the national Chemical Societies under the Union's sponsorship. Among recent ones were the International Symposium on Theoretical Organic Chemistry (Dubrovnik, 1982), co-sponsored by IUPAC, the 7th Yugoslav Congress on Chemistry and Chemical Technology (Novi Sad, 1983) and the 13th Yearly Congress of Yugoslav Students of Chemistry and Chemical Technology, with international participation (Tuzla, 1984). The Calendar of meetings sponsored by UYCS this year includes the 1st Yugoslav Symposium on Chemistry and Environmental Pollution (Beograd), TRISOC II — an International Symposium on Organic Chemistry (Bled), a Summer School on Polymers (Dubrovnik), the 9th Yugoslav Symposium on Electrochemistry (Dubrovnik), the 4th Yugoslav Symposium on Analytical Chemistry (Split) and 14th Yugoslav Congress of Students of Pure and Applied Chemistry (Bor).



The Boris Kidrič Institute of Chemistry, the seat of the Slovene Chemical Society in Ljubljana. The Institute is named after the late Federal Minister of Economy Planning.

The UYCS is funded through membership dues of the constituent societies. Participation in relevant international organizations is agreed upon in the Association of Self-managing Councils of Interest for Science and Research of the Republics and Provinces of Yugoslavia, and financed by the national Society which holds the Secretariat during a particular 2-year mandate. In the period 1984–86 the seat of the Union is in

Ljubljana, Slovenia, with Prof L. Kosta serving as President and Prof F. Lazarini as Secretary. Prof D. Hadži has been the Union's Honorary President since 1965.

Nine IUPAC Commissions now have Yugoslav chemists as Titular or Associate Members. In six others UYCS has National Representatives.

L. Kosta

Canadian Society for Chemistry

The Chemical Institute of Canada (CIC) has established a new constituent society, the Canadian Society for Chemistry (CSC), to join the Canadian Society for Chemical Engineering (CSChE) and the Canadian Society for Chemical Technology (CSCT) under the Institute's umbrella, thus better to serve the interests of the members of the three major chemical professions within CIC.

The aim of CSC is to establish, maintain and encourage high-quality research, development and education in chemistry, successful commercial chemical enterprises and chemically related government functions in Canada. The new CSC is expected to have about 6500 members.

Polymers in Australia

The Polymer Division of the Royal Australian Chemical Institute is sponsoring the following symposia:

Electrical, Optical and Acoustic Properties of Polymers, Macquarie University, Sydney, 2–4 September 1985;

Summer School on Emulsion Polymers and Latexes, University of Sydney, 5–7 February 1986;

15th Australian Polymer Symposium, Leura Gardens Motor Inn, Leura, NSW, 9–13 February 1986.

Further details may be obtained via Dr G. B. Guise, PO Box 224, Belmont, Victoria 3216, Australia.

30th International Congress of Pure and Applied Chemistry

The 3rd Circular, containing the full programme, of the 30th IUPAC Congress has now been published and is available from Dr J. F. Gibson, Royal Society of Chemistry, Burlington House, London W1V 0BN, UK. The Congress will be opened by Lord Todd, a former IUPAC President (1963–65), after which Sir George Porter will give a plenary lecture entitled 'Chemistry's Cornucopia'.

The scientific sessions, except for Section 5 and 6 below, will be held in the Renold Building of the University of Manchester Institute of Science and Technology (UMIST) — Sections 5 and 6 at the nearby Royal Northern College of Music. The organization of the scientific sessions has been slightly amended from that presented in *CI*, 1984, No. 4, p. 42. The final arrangement is as shown below — with the number of lectures expected in each Section/Subsection indicated in brackets.

1. Analytical — Current progress in analytical chemistry

- (a) New instrumental methods of analysis (7)
- (b) Advances in automatic methods, to include microcomputers (6)
- (c) Biotechnology — Analytical applications (6)
- (d) Environmental analysis (4)

2. Education

- (a) Chemical education research (8)
- (b) Laboratory work: aims, assumptions and realizations (7)
- (c) Changing requirements in manpower skills (jointly with 3d) (4)
- (d) Continuing education in chemistry (11)

3. Industrial — Chemical industry: Year 2001

- (a) Future basic feedstocks (8)
- (b) Future processes: Invention and design (8)
- (c) Environmental challenge
 - (i) The challenge of public opinion (4)
 - (ii) The global challenge (5)
- (d) Changing requirements in manpower skills (jointly with 2c) (4)
- (e) International and regional factors (4)

4. Inorganic

- (a) Electrochemistry and electron-transfer in inorganic and bio-inorganic chemistry
 - (i) Electrochemical synthesis of inorganic and organometallic compounds (6)

- (ii) Electron-transfer reactions in biological systems (4)
- (iii) Electron-transfer reactions in coordination chemistry and catalysis (5)
- (iv) Electron-transfer in extended lattices (5)
- (b) Chemistry of *p*-block elements
 - (i) Coordination chemistry of *p*-block elements (6)
 - (ii) Chemistry of the *p*-block elements and their compounds with transition metals (5)
 - (iii) Cluster compounds involving *p*-block elements (5)
 - (iv) Organometallic and organometalloid compounds of *p*-block elements (4)
- (c) Applications of new techniques in inorganic chemistry
 - (i) Infrared spectroscopy: a new light on an old technique (5)
 - (ii) Use of lasers in inorganic chemistry (4)
 - (iii) FT-NMR in high pressure and stopped-flow studies (5)
- (d) Metals in chemotherapy and radiation therapy
 - (i) Use of compounds of radioactive isotopes in radiation therapy and diagnosis (3)
 - (ii) Use of platinum and other metal compounds in chemotherapy (4)

5. Organic — Organic chemistry as a life science (26)

6. Organic — Dyestuffs: Past, present and future (15)

7. Physical

- (a) Reaction dynamics in the gas phase and in solution
 - (i) Dynamics in solution and super-cooled jets (8)
 - (ii) Dynamics of photodissociation and photoionization (8)
 - (iii) Dynamics of gas surface scattering (jointly with 7c (i)) (4)
 - (iv) Dynamics of chemical reactions and energy transfer (10)
- (b) Micellar systems
 - (i) Spectroscopy (5)
 - (ii) Scattering (6)
 - (iii) Transport properties (6)
 - (iv) Biological (6)



University of Manchester Institute of Science and Technology.

- (c) Surface science of solids
 - (i) Dynamics of gas surface scattering (jointly with 7a (iii)) (4)
 - (ii) Reaction kinetics and catalysis at surfaces (5)
 - (iii) Phase transitions at surfaces (4)

8. Physical/Analytical — New electrochemical sensors

- (a) Fundamentals (5)
- (b) Gas sensors (5)
- (c) Ion selective electrodes (7)
- (d) CHEMFETS and integrated devices (5)
- (e) Biosensors (8)

Workshop and exhibition.

The registration fees for active participants in the full meeting are £90 on or before 17 June, £100 after 17 June 1985. There are reduced fees for students and those attending only selected parts of the Congress. Accommodation will be available in halls of residence and, at concessionary rates, at Manchester hotels.

It is thought that there was a Celtic settlement, Mancenion, on the site of what is now Manchester and there was certainly a Roman fort,

Mancunium, in AD 80. The settlement was under the authority of the Saxons in the 7th Century but was destroyed by the Danes in AD 870. It was rebuilt in 920 and the right of its citizens to coin money was granted by King Canute. In the 14th Century the industry for which Manchester became famous, textile manufacture, was started by immigrant Flemish weavers. In the 18th Century the advent of steam power and the subsequent invention of devices for the mechanical manufacture of textiles transformed the area into a thriving industrial centre. In the 19th Century the town was given city status, the Manchester Ship Canal (connecting Manchester to the Mersey estuary for passage of ocean-going vessels) was opened and the University was founded. Much of the city centre was destroyed in World War II.

It is not only for textiles that Manchester is famous, for the last two centuries it has also been a centre for pure and applied chemistry and is at present one of the major centres of chemistry in Europe. In the UK, it is also said, perhaps slanderously, to be notable for the frequency of its rain!

IUPAC-SPONSORED CONFERENCES

Details available on IUPAC-sponsored conferences are given below. The latest brochures are available from the organizers listed on pp. 48–50.

10th International Congress of Heterocyclic Chemistry

Waterloo, Ontario, Canada,
11–16 August 1985

Details of the scientific programme of the Congress were given in *CI*, 1985, No. 2, p. 31. Further details have now come to hand about the place. These may be of interest — not only to intending participants.



University of Waterloo (photo courtesy of Mr Maurice Green, University of Waterloo).

The University of Waterloo enrolled its first students in 1957 and now has a student population of about 24 000, about one-third of which is part-time. The University introduced the idea of cooperative education into Canada; under this system students alternate four-month academic terms on campus with four-month work terms to gain practical experience in their career fields. About half of the full-time students are enrolled in programmes that are on the cooperative system. Another innovative venture was the creation, in 1974, of the Guelph–Waterloo Centre for Graduate Work in Chemistry, (GWC)², when the Departments of Chemistry at the Universities of Guelph and Waterloo (about 29 km apart) combined their strengths to form a joint graduate programme. Most of the Centre's research activities are basic or fundamental in nature but the cooperative system has also been extended to the postgraduate area with the establishment of

Cooperative MSc and PhD programmes in which the student spends a one-year work term in an industrial or government laboratory during his course.

One final remark — for intending participants. The weather in Waterloo in August is usually hot (28–32°C) and, as is often the case in the Great Lakes region, quite humid. Evenings can, however, be cool.

2nd International Symposium on Hydrothermal Reactions

State College, Pennsylvania, USA, 12–14 August 1985

The Symposium is designed to bring together those doing research on high-pressure aqueous and related chemical systems. Included in its scope are the fundamental physical chemistry of fluids at high temperatures and pressures; hydrothermal geochemistry, especially of geothermal systems and nuclear waste repositories; hydrothermal crystal growth; reactions used to prepare hydrothermal electronic materials and ceramics; hydrothermal corrosion; and near- and super-critical separation methods for recovery of valuable constituents.

The Symposium will consist mainly of contributed papers, presented orally or in poster sessions, as well as plenary and other introductory invited papers. The official language is English. All the scientific sessions will be held in the J. Orvis Keller Conference Center.

Accommodation is available on-campus at the Nittany Lion Inn, which is adjacent to the Conference Center, or in hotels and motels in the area. Early booking is recommended. The registration fee is US\$120 (which should have been paid by 1 March 1985).

(*Editor's note:* I wonder if Ed Adamitz is still the proprietor of The Cave in State College.)

8th International Conference on Thermal Analysis

Bratislava, Czechoslovakia, 19–23 August 1985

The Conference will take place in the Congress Centre 'Dom ROH' in Bratislava. It will comprise plenary lectures, summarizing reports and poster presentations, an exhibition and round-table discussions (workshops). Winners of various awards to be presented will also give lectures.

The *plenary lectures* to be given are:

- Mechanochemistry of inorganic compounds (V. V. Boldyrev, USSR)
- Philosophy of the mechanism of diffusion controlled solid state processes (V. Jesenák, Czechoslovakia)
- Thermoanalytical investigation of latent heat thermal energy storage materials (T. Ozawa, Japan)
- Comenius and Black: Progenitors of thermal analysis (R. C. Mackenzie, UK; I. Proks, Czechoslovakia)
- Quantitative thermal analysis of macromolecular glasses and crystals (B. Wunderlich, USA)

The majority of contributed papers will be in the form of poster presentations, each session being introduced by a summarizing lecture. The official language of the Conference is English but, to achieve the maximum of benefit from the poster presentations, interpreters will be available.

The following topics will be discussed at the workshops:

- Advances in thermoanalytical instrumentation
- Thermal characterization of non-stoichiometric oxides and other compounds and its application for energy storage and conversion
- Current problems of reliability of kinetic data evaluated by thermal analysis
- The use of computers and data storage in everyday thermoanalytical practice
- Theory and practice of less-common thermoanalytical techniques (emanation thermal analysis, thermosonimetry, other methods)
- Education in thermal analysis

Registration fees, for non-members of ICTA or its affiliated societies, are US\$230 before 31 March 1985 and US\$250 thereafter. Accommodation is available in various categories of hotel and in a students' hostel.

Bratislava, the capital of the Slovak Socialist Republic, was founded in the 10th Century on the river Danube. It is now a city of over 400 000 inhabitants.

8th International Conference of Chemical Education: Widening the Scope of Chemistry

Tokyo, Japan, 23–28 August 1985

The Conference will be held in the Keio Plaza Hotel, in west Tokyo, Shinjuku. The scientific programme will be developed along four major themes:

1. Chemical Education in the Computer Age.
2. Chemical Education for Fostering Future Chemists of Excellence.
3. Chemical Education for Life Sciences.
4. Chemical Education and Industry.

Conference activities will include: plenary and

invited lectures; contributed papers (mainly poster presentations but some oral); demonstrations; displays of textbooks, curriculum materials, micro-computer software; exchange of curriculum material and programmes; group discussions. The official language will be English. No simultaneous translation will be available but help may be obtained from volunteer interpreters.

Among the *plenary* and *invited* lectures are the following:

- Opening Address — M. Ōki (Japan).
- Theme 1. S. Sasaki (Japan), J. W. Moore (USA), D. Cabrol (France)
- Theme 2. G. N. Malcolm (New Zealand), R. Isuyama (Brazil)
- Theme 3. P. J. Kelly (UK), I. Nakayama (Japan)
- Theme 4. W. Beek (Netherlands), A. Hofstein (Israel)
- Closing Lecture — G. C. Pimentel (USA)

The Conference fee, if sent by 30 June 1985, is ¥30 000 (schoolteachers and students ¥15 000); if sent after June 30 1985 and on site, ¥35 000 (¥20 000). Arrangements are being made for accommodation in the Keio Plaza Hotel and in other hotels in the neighbourhood.

The weather in Tokyo during August is often humid and hot (28°–32°C) but conference rooms and hotels are air-conditioned.

International Symposium on Applications of Mathematical Concepts to Chemistry

Dubrovnik, Yugoslavia, 2–5 September 1985

The scientific sessions of the Symposium will be held in the Hotel Libertas in Dubrovnik. They will consist of invited lectures and contributed papers on all aspects of the development and application of mathematical concepts to chemistry.

The Symposium will begin with introductory remarks by Prof V. Prelog (Switzerland), Nobel Laureate 1985. The remaining *invited lectures* will be:

- Molecular mechanics and conformational analysis (N. L. Allinger, USA)
- Coding of chemical structures (D. Bonchev, Bulgaria)
- On graph-theoretical polynomials in chemistry (K. Balasubramanian, USA)
- Mathematical modelling of chemical reactions (S. D. Bosanac, Yugoslavia)
- Application of Monte Carlo method for studying the hydration of molecules (V. I. Danilov, USSR)
- Theoretical evaluation of steric factors on rates and equilibria of chemical reactions (D. T. DeTar, USA)
- Mathematical fundamentals of complex chemical reactions (H. P. Fritzner, Austria)
- Topological charge stabilization (B. M. Gimarc, USA)
- Non-numerical methods in chemistry (F. E. Harris, USA)

Systematic synthesis design by computer (J. B. Hendrickson, USA)

Graph-theoretical descriptions of boranes and carboranes (W. C. Herndon, USA)

Topological index as a common language in quantum chemistry, statistical mechanics, and graph theory (H. Hosoya, Japan)

Valence — A measure of used covalent bonding capacity of atoms (K. Jug, FRG)

Quantum chemical and physicochemical studies of oxime reactivators of inhibited acetylcholinesterase (J. J. Kaufman, USA)

Topological aspects of chemically significant polyhedra (R. B. King, USA)

Ionization energy in some mathematical models of chemistry (L. Klasinc, Yugoslavia)

The role of chemical graphs in many-body cluster expansions (D. J. Klein, USA)

Approximate treatment of surface phenomena (Z. B. Maksić, Yugoslavia)

Multi-channel quantum defect theories (S. P. McGlynn, USA)

Differential and algebraic topology of chemical potential surfaces (P. G. Mezey, Canada)

On many-body cluster expansion theories (H. J. Monkhorst, USA)

On the topological indices: The range of applicability (I. Motoc, USA)

(a) Computer database for potential energy functions, (b) The mathematical training of chemists (J. N. Murrell, UK)

Molecular mechanics of strained systems (E. Osawa, Japan)

Topological effect on molecular orbitals (O. E. Polansky, FRG)

The conjugated circuits model (M. Randić, USA)

Modelling of molecules (K. Rasmussen, Denmark)

On applications of Green Operator methods to molecular response and relaxation processes (W. Rhodes, USA)

Applications of shape theory in the design of drugs (D. H. Rouvray, USA)

An *ab initio* study of the addition of acetylenes to olefins (L. J. Schaad, USA)

On the mathematical models for isomerization problems (Z. Slanina, Czechoslovakia)

On the reduced graph model (N. Trinajstić, Yugoslavia)

Molecular orbital resonance theory approach: Application and development (T. Živković, Yugoslavia)

The registration fee, paid before 1 June 1985, will be US\$100; late registration between 1 June and 2 September 1985 will cost US\$125; US\$150 will be required to register on arrival (equivalent amounts in any convertible currency may be paid instead of US dollars). The weather in Dubrovnik in early September should be pleasantly mild.

12th International Conference on Organometallic Chemistry

Vienna, Austria, 8–13 September 1985

The Conference is to be held in the Conference Centre in the historic Castle Hofburg, located in the centre of the city close to many beautiful and celebrated sites of Vienna. The scientific programme will include plenary lectures, section lectures and scientific contributions, presented orally or as posters. The Conference language is English. There will be five *plenary lectures*:

The close ties between organometallic chemistry and the solid state (R. Hoffmann, USA)

Olefin complexes of alkylmetals as models for organometallic catalysis (H. Lehmkuhl, FRG)

Tin(II) compounds as synthetic control elements in organic synthesis (T. Mukaiyama, Japan)

Transition metal NMR-spectroscopy — A probe into organometallic structure and catalysis (W. von Philipsborn, Switzerland)

Synthetic and structural studies on metal cluster compounds (F. G. A. Stone, UK)

Section lectures planned are:

Di-Grignard-reagents and metallacycles (F. Bickelbaupt, Netherlands)

Magnesium dihydride: Preparation and reactions (B. Bogdanovic, FRG)

Metal carbonyl clusters: Thermodynamics of their formation and stability — some novel results on cobalt, rhodium, ruthenium and mixed clusters (G. Bor, Switzerland)

New chemistry of metal complexes containing ligands attached by *sp*- or *sp*²-hybridised carbons (M. I. Bruce, Australia)

Carbonyl complexes of late transition elements: Atypical M—CO bonds (F. Calderazzo, Italy)

The reactivity of hexa- and pentacoordinated species — a new route for the preparation of organosilanes directly from silica (R. Corriu, France)

Some highly sterically hindered organosilicon compounds (C. Eaborn, UK)

The chemistry of heterometallic carbidocarbonyl clusters (S. P. Gubin, USSR)

Mechanic aspects of organometallic catalysis (J. Halpern, USA)

C-Lithiated organophosphines as complex ligands (K. Issleib and H. P. Abicht, GDR)

Transition metal carbonyl hormones (G. Jaouen, France)

Organometallic polymers (C. U. Pittman, Jr, USA)

New application of organoboron compounds in organic synthesis (A. Suzuki, Japan)

Some new developments in aryl-gold and aryl-platinum chemistry (R. Uson, Spain)

Accommodation will be in Viennese hotels. Registration fees for active participants are AS 3000 if payment is received before 1 July 1985, AS 3500 after that date. The average temperature in Vienna in September is 17°C. Participants are advised to bring an overcoat and an umbrella.

24th Colloquium Spectroscopicum Internationale (CSI XXIV)

Garmisch-Partenkirchen, FRG, 15–21 September
1985

The scientific sessions will be held in the Kongresshaus, a modern purpose-built centre built in the traditional Alpine style. The programme is limited to two kinds of presentation — invited lectures and posters. About 60 invited lectures are planned, to be presented in three parallel morning sessions; the poster sessions will be in the afternoons. It is hoped to group the posters thematically and to have them introduced by a coordinator. Subjects of special interest will be discussed by panels and at round tables.

The topics to be covered come under two main headings:

Basic theory methods

- Atomic emission spectroscopy
- Atomic absorption spectrometry
- Atomic fluorescence spectrometry
- X-ray emission and fluorescence spectrometry
- Methods of surface analysis and depth profiling
- Infrared and Raman spectroscopy
- Molecular spectroscopy (UV and VIS)
- Nuclear magnetic resonance spectroscopy (NMR)
- Radiation detectors, data recording and handling, automation

Laser spectroscopy

Mass spectroscopy (organic and inorganic)

Activation analysis

Standard reference materials, etc.

Analytical applications for specific problems

Analysis of metals

Analysis of various industrial products

Geochemical analysis

Biological, clinical and pharmaceutical analysis

Analysis in agriculture and nutrition chemistry

Environmental analysis

Sample preparation

The Conference languages will be English, French and German; no translation facilities will be available. Hotel accommodation of all sorts is readily available in Garmisch-Partenkirchen. The conference fee is expected to be DM 450.

The former Olympic Town of Garmisch-Partenkirchen is in the Wedenfels Valley of Upper Bavaria at the base of the impressive Alpspitze (2628 m) and dominated by Germany's highest peak, the Zugspitze (2964 m). On the other side of the valley are two lesser mountains, the Wank (1780 m) and Kramer (1982 m). However, for those who have any spare time from the conference and absorbing the splendour of the mountains, there is a wide variety of other attractions available — food, drink, music, swimming, golf, a casino, a folklore museum — most of which can be combined with continued discussions on spectroscopy.



The Kongresshaus, Garmisch-Partenkirchen

**International Conference on the
Applications of the Mössbauer Effect**
Leuven, Belgium, 16–20 September 1985

The Conference will be held in the Grote Aula auditorium in the ancient (founded 1425) University of Leuven, located in the centre of the old city. It will consist of invited lectures and contributed papers, some presented orally but most in poster sessions.



The Town Hall, Leuven (photo courtesy of Mr M. Elskens)

The *invited lectures* to be presented are:

Local order in chalcogenide glasses (P. Boolchand, USA)

Minerals, sediments and coals (J. Cashion, USA)
Biomolecules (D. P. E. Dickson, UK)
Amorphous magnetic insulators (M. Eibschutz, USA)
Concluding remarks (V. I. Goldanskii, USSR)
Mössbauer spectroscopy in China — archaeology (Y. F. Hsia, China)
Competing anisotropy magnetism (A. Ito, Japan)
Mössbauer relaxation of nonlinear dynamical excitations in low-dimensional magnets (L. J. de Jongh, Belgium)
Surface magnetism by depth-selective CEMS (W. Keune, FRG)
Simple examples of electronic and structural dynamics (J. Litterst, FRG)
Local order in amorphous intermetallics (M. Maurer, France)
Technological applications of Mössbauer spectroscopy (P. A. Montano, USA)
Novel iron-sulfur clusters in proteins (E. Münck, France)
Isolated atoms, molecules and clusters (M. Pasternak, Israel)
Intermediate valence (E. V. Sampathkumaran, India)
Metallic superlattices (T. Shinjo, Japan)
Coherent effects in resonant diffraction: experiment (G. V. Smirnov, USSR)
Coherent effects in resonant diffraction: theory (U. van Bürc, FRG)
Catalysis (H. Topsøe, Denmark)
Spin glasses under external magnetic fields (F. Varret, France)
Ion implantation (G. Weyer, Denmark)
Synthetic metals (G. Wortmann, Berlin)

Accommodation can be reserved in one of the several student residences of the University; hotel accommodation is limited and not many hotels are within easy walking distance of the Conference building. The registration fee is 6000 BEF and registration was requested by 1 April 1985.

**International Symposium on Organic
Chemistry of Medicinal Natural Products**
Shanghai, China, 10–14 November 1985

All sessions of the scientific programme of the Symposium will be held at the Shanghai Science Hall and the Auditorium of the Shanghai Institute of Physiology, Academia Sinica. The programme will consist of plenary lectures and contributed papers presented orally or by posters. These will cover the fields:

Isolation, structural elucidation and biological activity studies of medicinal natural products
Synthetic studies related to medicinal natural products
Bioorganic chemistry related to medicinal natural products

The official Symposium language is English.

The Opening Ceremony will conclude with a lecture by Sir Derek Barton (France) on *Some recent progress in the chemistry of natural products*. Other invited, plenary, lectures expected to be given are:

Chemical investigations on West African medicinal plants (H. Achenbach, FRG)

Studies on plant pathogenic compounds from *Helminthosporium* species (D. Arigoni, Switzerland)

On some aspects of indole chemistry (A. Chatterjee, India)

Biologically active complex compounds from marine animals (Y. Hirata, Japan)

Recent developments of diterpenoid alkaloids chemistry in China (X. T. Liang, China)

Structural studies of bioactive molecules (*tentative title*) (K. Nakanishi, USA)

Bioorganic chemistry of rhodopsins (Yu. A. Ovchinnikov, USSR)

Contributions of an organic chemist to the resolution of some biological problems: Consequences (P. Potier, France)

Identification and characterization of an endogenous cytometallophore of general distribution in the plant kingdom (K. Schreiber, GDR)

NMR studies of biosynthesis and enzyme mechanism (A. I. Scott, USA)

Progress and problem in stereocontrol (G. Stork, USA)

Structural studies on bioactive microbial metabolites (Ch. Tamm, Switzerland)

Synthesis and chemistry of cyclopentenone antibiotics (Y. Thebtaranonth, Thailand)

Scientific evaluation of Chinese medicine *Tian Hua Fen* — History, chemistry and application (Y. Wang, China)

Progress in the synthetic and medicinal chemistry of cardioactive steroid glycosides (K. Wiesner, Canada)

Recent advances in chemical studies on the active principles of Chinese anti-fertility medicinal plants (R. S. Xu, China)

Chemical research of Chinese traditional herb *Qing Hao* (W. S. Zhou, China)

Arrangements are in hand for exhibitions of Chinese medicinal plants, natural medicinal products and related books.

Accommodation will be arranged in hotels in Shanghai in a 'package' system, the package including transport to and from the airport and between hotel and meeting hall, hotel room and three meals per day. Rooms are in short supply and early booking is strongly recommended. The registration fee for active participants is US\$125 if posted by 1 June 1985, US\$150 thereafter. This includes a mixer, reception, banquet and an excursion or visit to scientific institutions as well as abstracts of the papers and other Symposium paperwork.

Shanghai weather in the middle of November is usually mild with temperatures up to 20°C in the day and down to 5°C at night. Light rain should be expected.



Shanghai Science Hall.

Higher Chemical Education in the USSR

by Prof G. E. Zaikov and
Prof Z. E. Samoylova

Ever since 1917 an overall programme of cultural reorganization has been implemented in the USSR. In this relatively short historical period an enormous breakthrough has been made, from mass illiteracy to widespread and high-level education. In the 1983-84 school year the number of general education schools approached 141 000, with 2.7 million teachers and 44.5 million pupils, whereas there were only about 160 000 pupils in grammar and public schools in 1913. In comparison with 1917 the number of university level students has increased more than 40-fold and the number annually graduating nearly 70 times. According to the statistics for 1984, there are now 686 higher or secondary school graduates per thousand adults of the population. Every year the universities, institutes and technical schools send more than 800 000 well-trained specialists into various fields of the national economy, which comprises nearly half of the total addition to the labour force. In the post-war period the number of specialists with higher and specialized secondary education has increased more than 14 times (see Table 1)¹.

Higher education exerts a significant influence on the social structure, on all other levels of public education, and on the science and culture of the country. It also plays an active role in international cooperation: students of 146 foreign countries study at Soviet institutions; since 1950 more than 150 000 specialists from abroad have received their education in the USSR.

The educational system is constantly developing in accordance with advances in science, engineering and culture. There is a tremendous volume of special literature on higher education. It contains reference books and bibliographies², studies of the history and current status of various educational

Prof Zaikov is a member of the CHEMRAWN Committee and of the Finance Committee; Prof Samoylova is Scientific Secretary of the National Committee of Soviet Chemists.



Prof G. E. Zaikov

establishments³, the development of higher education in the various Republics, Territories and Regions of the USSR⁴, university and specialized higher school training of specialists for various fields⁵, analyses of different periods in the development of higher education⁶, and interconnection between higher education and the scientific and technological revolution⁷.

Table 1. Number of specialists with higher and specialized secondary education employed in national economy (10³ persons).

Year	Total	Number with higher education	Number with specialized secondary education
1941	2401	909	1492
1960	8784	3545	5239
1970	16841	6853	9988
1975	22796	9477	13319
1980	28612	12073	16539
1983	31000	13000	18000

During the last few years new works have been published on pedagogy in higher education⁸, research at institutions of higher education⁹, management planning and economics of education¹⁰ and also a number of sociological and philosophical studies¹¹. Some books¹² have reviewed the recent history, present state and outlooks of higher education. There is a large number of periodical publications, i.e. institute proceedings and university bulletins, that publish the results of research at institutions or higher schools by scientists, postgraduates and students.

The right of every citizen for education is secured by the Constitution of the country. The educational system is based on the principle of equality of all citizens to study, of universal compulsory secondary education, of free education, of unity of the educational structure throughout the country and conformity between education at different levels. This last affords smooth transition from one stage to the next, from the lowest level of education to the highest. For entrance to a higher education institution one can graduate from any type of secondary school (ten-year general education school or eight-year general education school followed by a vocational or technical school). Up to the present time all children attend a general education secondary school from the age of seven. Prior to that the majority of children attend pre-school establishments — creches and kindergartens, whose number is constantly increasing (see Table 2). The availability of pre-school establishments has made it possible for women to continue studying and remain active in society after having children. As

Table 2. Growth in the number of pre-school establishments.

Year	1940	1960	1970	1980	1983
Number (× 10 ³)	46.0	70.6	102.7	127.7	135.5



Prof Z. E. Samoylova

a result, the level of education has become practically the same for men and women (see Table 3). During the period 1918–83, 102.9 million pupils received secondary education —

Table 3. Education level of men and women: Number of persons of each sex with higher and secondary (complete and incomplete) education per 1000 employed.

Year	Total		Number with higher education		Number with secondary (complete and incomplete) education	
	m	w	m	w	m	w
1939	136	104	16	9	120	95
1959	434	431	34	32	400	399
1970	654	651	68	62	586	589
1979	810	801	102	98	708	703
1984	873	862	118	113	755	749

Table 4. Number of persons studying at different levels ($\times 10^6$ persons).

		Years	1940/41	1960/61	1970/71	1975/76	1980/81	1983/84
Educational establishments								
Secondary education	general	general education schools	35.6	36.2	49.2	47.6	44.3	44.5
		specialized	special vocational schools	0.7	1.1	2.6	3.4	4.0
	technical schools		1.0	2.1	4.4	4.5	4.6	4.5
Higher education		universities, institutes, higher technical and arts colleges	0.8	2.4	4.6	4.9	5.2	5.3
		re-training and continuous education courses	9.5	10.9	18.8	32.2	42.1	47.7
Total			47.6	52.7	79.6	92.6	100.2	106.1

general and specialized — and of these 79.8 million finished in secondary general education schools, 18.5 million in technical schools and 4.6 million in vocational secondary schools. In 1983 the number of pupils finishing general education schools was 12 times greater than in 1940; the total of pupils enrolled was 38.75% of the population. Table 4 presents the distribution of the types of training.

In 1984, after wide public debate, a plan for reform of school-level education was adopted. Curricula are to be revised, to bring them closer to social requirements, and more active teaching methods will be introduced into the school practice. Much attention is given to the individual approach in educating children, to harmonious development of each child's personality. Much attention is also devoted to education via productive labour. The necessary technical means are to be provided — arrangements for practical training at industrial plants and in agriculture have been made. In this way, upon leaving a secondary school of any type, every young person will not only be provided with a general education but will also be trained for work in some field.

The secondary school curriculum in the USSR includes a 5-year chemistry course, a 6-year school course in physics beginning the year before. Two years of general natural history are followed by a 6-year course in

biology. One year of the geography course is devoted to the economic geography of the USSR and another to the economic geography of other countries. These last subjects cover the development of the chemical industry, sources of raw materials for it and power resources. The principle of differentiation of natural scientific subjects is observed, but interdisciplinary connections are stressed, especially in final review courses. In this way, the positive aspects of integrated teaching of the natural sciences are obtained.

The school course in chemistry is based on a gradual transition from the simple to the complex. It opens with an acquaintance with the properties of important common substances, with much attention being paid to laboratory experiments. A study of the classification of inorganic compounds and basic quantitative relationships precedes the periodic law. Since the introductory course in physics is started earlier, it helps the pupils to grasp the peculiarities of chemistry and its definition as a separate science. After the periodic law, a deeper study of fundamentals of inorganic, organic and physical chemistry begins. During the whole teaching process the courses in physics and chemistry supplement each other. For example, at the chemistry lessons the concept of an atom is conveyed to the pupils on the basis of the elementary course in physics, and deeper

knowledge of the structure of matter is only given during a final quantum physics curriculum.

The most urgent problem of the modern school is improvement of the educational content and enhancement of its connection with practice. School leavers must be prepared not only for entering a higher school, but also for mastering a trade in a specialized secondary school or directly in industrial production or agriculture. As for chemistry, the main task of the school is to reveal more thoroughly, without lowering the scientific level, the versatility of the applications of chemistry in various spheres of production and in everyday life. For this purpose an approach based on system and structure is being improved with the aim of stimulating creative and independent thinking. The methodology of problem-solving and of chemistry laboratory experiments is also being improved. Excursions of pupils to industrial chemical enterprises are organized. Early choice of a vocation is aided by extra-curricular activities, i.e. optional additional courses, study groups and inter-school participation in competitions (olympiads). Several rounds of such olympiads in all subjects are held annually. In 1983 for example, in the IXth All-Russian Chemistry Olympiad for school children, 1 434 019 pupils participated in an in-school round, 182 623 winners in inter-school district rounds and then 7 649 in a regional round¹³.

The advancement of teachers' training is an important condition for improving teaching of chemistry. The number of chemistry teachers in secondary schools in the USSR amounts to 82 500, of whom 90% have specialized higher education¹⁴. A large number of special books and manuals for teachers are published on chemistry teaching methods, how to conduct optional additional lessons, on school laboratory equipment, etc. Special reviews of recent achievements in chemistry, developments in the chemical and associated fields of industry are also issued. Every teacher must at regular intervals attend special courses for advancing chemistry teaching at higher educational institutions. The journal *Chemistry in the School* which, for example, published recommendations on how to use IUPAC rules governing the nomenclature of major classes of compounds¹⁵, has a circulation of more than 150 000. A great contribution to these activities is made by the specialists in the higher school and scientific institutions of the Ministry of Public Education, the Ministry of Higher and Secondary Specialized Education, the Academy of Pedagogical

Sciences and the USSR Academy of Sciences. There is a constant link between the secondary and higher schools.

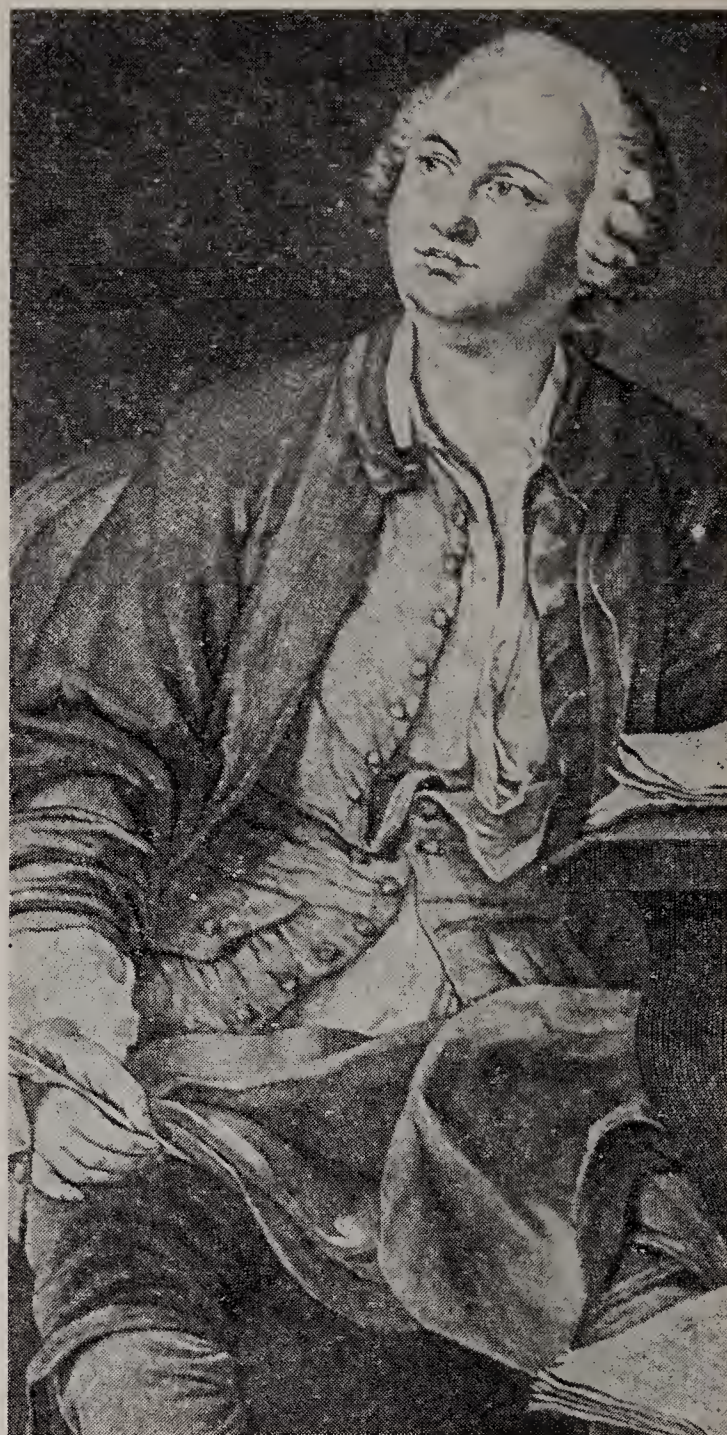
Since the "educational boom" of the end of the fifties and especially in the sixties, a stable relationship between the number of specialists graduating and the requirements of the national economy has been maintained. This has made it possible to stabilize the rate of growth of higher education and to devote more attention to the quality of teaching. The governmental decree of 1979 "On further development of the higher school education and improvement of the quality of specialist training" represents an integral approach to improving the quality of higher education, making it more flexible and mobile, and strengthening its ties with all aspects of society. Three main paths can be defined in this integral approach. The first is all-round improvement of the level of qualification in training of specialists — this is the principal aim in higher education. The second is full and stable satisfaction of the needs for specialists for the national economy, especially in its leading fields, as well as in the fields of science and culture. The third is growth of the material resources for education (buildings, equipment, etc.), improving the level of qualification of higher school teachers and their working conditions in various regions of the country, e.g. Siberia, the far north, the far east and others.

These three paths are also of prime importance to the improvement of higher chemical education. Chemical education is traditionally divided into two types, engineering and university (applied and pure chemistry). In the USSR 60 universities and 64 technical higher schools are at present engaged in the education of chemists, chemical engineers and technologists in 30 fields of chemistry and 55 more detailed specializations¹⁶. In 1974 the curricula of the higher schools were unified and a course was set for the training of broad-speciality chemists, engineers and technologists. This permits better compliance with current needs of the national economy in specialists, thus avoiding discrepancies between the number of graduates in a field and the requirements for young specialists. However, this does not mean that deep knowledge in a specific particular field of chemistry or chemical technology is no longer demanded. To achieve this, new and more flexible forms of education must be developed.

One of these experimental forms is higher educational training based on special individual schedules for students of senior years. After 3–4

years of fundamental training, the students continue their studies in a particular field directly in an appropriate scientific research institute or industrial plant, in which they are usually employed after graduation. Thus, having acquired general knowledge in a special field, the young people then become specialists in a particular field, not after their graduation, but during the process of study. This leads to improvement in the level of qualification and reduces the period of adaptation of graduates in their first jobs.

Such a modified system of joint specialist training was initiated at the Moscow Institute of Technical Physics and is now used in various higher chemical schools, for example, at the Mendeleev Chemical-Technological Institute in Moscow, the Lomonosov Fine-Chemical Technology Institute in Moscow, and Leningrad Technological Institute. To work in modern chemical science and technology a specialist must have a command of algorithm programs, hardware and organization of automated complexes, mathematical simulation, optimization techniques, system's analysis, experiment planning, man-machine systems, etc. This poses the problem of mathematization of all teaching processes, on the one hand, and of training specialists in accordance with various functions, on the other. Although training for such different functions as research, design, production and organization must be different, there is much in common for all of them with respect to modern mathematical methods and computer technology. It follows that mathematization of the education process is of equal importance both in training chemists and chemical engineers. This also applies to other principles underlying the enhancement of chemical education. First of all this means fundamentalization, by which is meant raising the theoretical level of every discipline, a more generalized approach and systematization, critical reviews of the information in the continuously growing bulk of data, integration of fundamental disciplines and unification of the study programmes of basic courses. A general tendency to enhance the humanitarian components in educating scientists and engineers is characterized by the increase of school hours devoted to economics and philosophical disciplines and by the introduction of new courses in law, environmental protection, ethics and aesthetics, history of chemistry, history of world culture, etc. Of course, both types of higher chemical education retain their specific characters, but now a tendency can be observed of their convergence



M. C. Lomonosov – a great Russian scientist, founder of Moscow University and the Academy of Sciences.

and mutual adoption of positive features, i.e. the scope and fundamental nature of university education of chemists and the practical skills in problem-solving of modern dynamic technology that are acquired in higher chemical-technological schools.

It should be noted that the need for specialists with traditional university education has been constantly increasing not only in the spheres of science and education, but also in industry¹⁷. The reasons for this phenomenon are complicated. One of them is that in the present era of scientific and technological progress, obsolescence of knowledge presents a most acute problem, especially in the sphere of engineering education. If during the last century basic knowledge acquired in a higher school was

sufficient for practically the whole of one's life, it is now believed that half of the acquired technical knowledge becomes obsolescent in a decade, and that most of the knowledge that will be needed for the future activities of today's student is still unknown¹⁸. We believe that it is impossible unequivocally to favour one type of education over another, but that if the aims of university education have really been fulfilled, i.e. if a student has acquired knowledge that becomes obsolete very slowly or practically not at all in the complex of fundamental sciences (mathematics, physics, chemistry and biology), then it is possible to educate a specialist of broad scientific vision, who is capable of clearly visualizing the demands of a modern society and solving its problems.

Let us consider in detail the structure of higher chemical education taking as an example Moscow University and its Chemical Faculty¹⁹. Employing the concept of unity of the sciences, the Chemical Faculty organizes its scientific activities and the teaching process in constant liaison with cooperating natural science Faculties of physics, biology, mechanics and mathematics. A task of major importance — selection of new students with the appropriate

inclinations — is solved by the participation of Faculty members in vocational guidance activities for young people. These activities involve organization of chemical societies for children in schools and at the university, chemical olympiads, teaching in specialized chemical schools, and training of chemical laboratory assistants in inter-school centres of labour education. As a result, up to one third of first-year students are school leavers who were influenced by the Faculty. Students of this category not only have better primary training in chemistry but they also clearly understand their future speciality, join in scientific activities earlier and better adapt themselves to the new educational system in a higher school. Such adaptation of first-year students is a serious problem. This is confirmed by the fact that the number of students who drop out after the first year averages up to 10%. However, during recent years, stabilization of the influx of young people to higher school education, on the one hand, and improvement of the unified study programmes in secondary schools, on the other, have led to a relative uniformity of the first-year students' composition with respect to age, educational and cultural levels. A short (18-hour) course "Introduction to your special field", which acquaints students with traditions and structure of the Faculty, fundamentals of scientific information, library utilization, planning and organizing independent study, is of great importance for the process of adaptation. This course helps yesterday's school pupil to change his attitudes and realize the fact that a student is not taught but educates himself.

The period of study in the Chemical Faculty is 5 years. In view of the need to intensify education a key task is to revise the content and improve the curricula, determine the necessary minimum of subjects, their succession and correlation. In 1976 the Chemical Faculty adopted a new curriculum with emphasis on strengthening the fundamental training of students. The subjects studied can be divided into four groups:

1. general education (25%) — philosophy and social sciences, foreign language, physical training;
2. general scientific (20%) — subjects of the physics and mathematics group;
3. field courses (45%) — fundamental chemistry subjects;
4. special (10%) — chemical courses in a narrow field of specialization.



Moscow University

The subjects of the second and third groups provide the basic training in the general field. Traditionally, in the Chemical Faculty the study of physics is extensive and at a high level. It is conducted for the Chemical Faculty by a special chair in general physics which is attached to the Physical Faculty. There is no similar chair of general mathematics in the university but, in association with the teachers of Mechanics and Mathematics Faculty, a special Science and Methods Council of the Chemistry Faculty has carried out the necessary work for improving the quality of mathematical training of the students. A full course in linear algebra, a course in programming and computer use, and lessons in the use of mathematics in solving chemical problems are included in the new curriculum.

Nearly half of total teaching time is devoted to studying chemistry. Here a prime question is the best sequence of teaching the separate divisions of chemistry. For example, insufficient training of students in physics and mathematics is a hindrance during the physical chemistry course if it is given too early. Introduction of some chapters of physical chemistry (certain elements of chemical thermodynamics, chemical kinetics, structure of matter) into the primary inorganic chemistry course delivered in terms I and II was found to be the best answer, along with overlapping of the courses of organic (terms V and VI) and physical chemistry (terms VI and VII). The very voluminous course of analytical chemistry has been revised and renewed. The theoretical fundamentals of the various analytical methods have been emphasized, mechanisms of the analytical reactions are considered and the laboratory study of modern physicochemical analytical methods has been improved. The study of chemical technology has been modernized, for example, a new course "Chemical Macrokinetics" has been introduced.

The final educational stage (terms VIII and IX) is devoted to specialization. Its aims are to teach the student to apply in practice the knowledge which he acquired during his study of the fundamental subjects. At this stage, a student can choose from among some 184 special courses given at 15 chairs which prepare him for independent work on his experimental graduation thesis. It is these courses that provide the students with knowledge of recent scientific developments. The courses are continuously updated and modified, and convey to the student a feeling for the dynamics of developments in various special fields. Narrow specialization in university education does not

mean just a more detailed or thorough study of some questions of chemistry. Essentially it is also a study of fundamentals but within the framework of a particular problem. Therefore the 10% of teaching time devoted to the special courses prove to be quite sufficient for providing a student with knowledge on the current state of one part of chemical science and, in doing this, of the methodology of scientific investigations. This approach makes the graduate capable of working in any field of chemistry and is in accord with the degree of "chemist" in the unified diploma of all graduates from university chemical faculties. For this reason there is a constant demand for specialists with university degrees in various spheres of the national economy. Related to this is also the fact that many research results have practical applications. This means that students' training in fundamental sciences helps the graduate to employ a theoretical approach in solving complex technical problems and in planning research work for industry.

On the other hand, during recent years the technical higher schools ("institutes") have tended to approach university level with respect to the depth and fundamental nature of the education they provide and to train research engineers of broad specialization. Condensing and eliminating descriptive and highly special courses make it possible to devote more time to fundamental sciences, the study of physico-mathematical sciences and economics. Questions still remain, such as the best ratio between the fundamental disciplines, and between the general engineering and special engineering courses²⁰. The importance of these questions follows from the fact that the higher qualifications required from specialists grow together with the accelerating growth of the chemical and associated industries in which complex technological processes, and equipment of large individual capacity, must be put on line — involving modern computers, automated control systems, etc. The training of a chemical engineer must provide him with the capability for keeping abreast with technological progress in his selected field, for utilizing the extensive available scientific and technical information (whose volume doubles every 5 to 7 years), to be able to switch to new, progressive ideas and to solve not only those problems which may confront him today, but also those of tomorrow.

Student participation in research work is an extremely effective form of developing creative capabilities. This includes individual assignments with questions which cannot be solved by



The morning of a new academic year.

standard methods; laboratory experiments associated with research being carried out by Faculty members; preparation of reviews on a given scientific problem, including social aspects; participation in Faculty scientific discussions and seminars; student research and design activities; research on production problems during industrial training; and, finally, work on both course and diploma research schemes. The experience of involving students in research work at the Mendeleev Institute of Chemical Technology in Moscow is of considerable interest²¹. Individual curricula are developed for outstanding students. These curricula permit the students to carry out research work at leading scientific research institutes twice a week, beginning in the third year. This approach leads to early determination of where the young specialists will eventually work and as a result helps to plan special training to meet the requirements of the national economy.

One of the most important educational concepts is that of continuous education²². Due to the importance of chemistry for society, this of course also applies to chemical education. At the moment obvious contradictions have arisen between the level of scientific knowledge and

higher school education, between the volume of accumulated information and the length of educational terms, between the rate of growth of knowledge and the methods for mastering it²³. However, almost all the possibilities for improving the traditional teaching process are exhausted. For this reason, development of education can be in only two ways, namely introduction of non-traditional types of higher school education and continuation of education after graduation.

One form of post-diploma education is by means of a system of special courses for improving qualifications that have been provided by the leading institutes and universities for many years. At present this system is also being reorganized. Standard higher school methods — lectures and seminars — can no longer do the job of improving professional knowledge and skills. The most effective forms of studies for specialists who attend such courses to improve their skills, as a rule every 5–7 years, are active ones, i.e. modelling of situations, searching for optimum solutions to technological, economic and administrative problems, business games, etc. Much attention should be given to questions of sociology, psychology, fundamentals of research, information, history and methodology of science, futurology, patent law, etc. On the other hand, it is necessary to establish channels of feedback from industry to the system for improving the qualification level, which should provide functions of two kinds: consultation and forecasting future trends²⁴.

Postgraduate education for a higher degree is the main form of educating researchers and university level teachers. It is conducted at large centres of education which can provide qualified scientific guidance and modern experimental equipment. By 1980 more than 600 higher schools and 1300 scientific research institutes were training over 96 000 postgraduates working towards a candidate degree²⁵. The competitive procedure for enrolment in such postgraduate study involves taking three examinations: in the special field, philosophy and a foreign language. Graduates from a higher school who have shown an aptitude for research work and been recommended for further study by the chair staff and higher school administration, and men and women with practical experience and some research background in their selected field, are admitted to the competition. The term of study in a full-time internal postgraduate course is 3 years — 4 years in an extra-mural course. During this



The soil chemistry laboratory, Soil Science Department.

period the postgraduate conducts research on an approved subject under the guidance of an experienced professor or other doctor of science, and studies a foreign language, pedagogy fundamentals, psychology, social sciences. The universal procedure of certification and control of postgraduates' knowledge includes postgraduate examinations, regular written and oral reports on research results, and publication of scientific papers. Postgraduate study is completed by submission and defence of a thesis for the degree of Candidate of Science. So-called "contracted" postgraduate study is practised on a large scale. This means that an enterprise which does not have the facilities for training high qualification specialists itself sends its employees elsewhere for postgraduate study, with the proviso that they return to their place of work after ending the studies. This is a flexible means of providing the various regions of the country and branches of the national economy with specialists for their educational and scientific institutions and industry. One-year postgraduate courses turned out to be a very effective form of improving the qualifications of the scientific and pedagogical specialists in higher schools. Working graduates who have prepared a thesis and have passed the graduate studies examinations at one of the higher school or research institutes independently (i.e. without studying in postgraduate courses) can also receive the degree of Candidate of Science; their number reached 20 000 by 1980. Diverse forms of assistance — experimental equipment, consultations, 3-month paid leaves — are provided for working graduates.

Serious attention is also devoted to training scientists for the highest qualification — Doctor of Science. Since 1950 the fraction of all

employees belonging to this category of scientist increased rapidly and by 1980 reached a stable figure (0.4% in 1950, 0.86% in 1965, 1.22% in 1980 and 1.24% in 1983). At the same time during the last two decades the fraction of candidates and Doctors of Science among scientific workers has increased by 1.5 times (22.4% in 1965 and 31.1% in 1983)²⁶. An effective means for improving the scientific pedagogical level of postgraduates is certification, which is supervised by the Higher Certification Commission (VAC) under the USSR Council of Ministers.

Finally, at least a brief mention should be made of the availability of forms of self-education and the social status of students.



It's the same the world over — a student works on his thesis.

There are now 300 000 libraries in the country — public libraries, scientific ones at educational institutions, technical and other special libraries — with a fund of nearly 5 billion books. Over 200 publishers print books and periodicals. From 1918 to 1983 the number of titles exceeded 3.4 million, with total printing amounting to 60 billion copies. It is significant that more than two-thirds of all young people regularly visit libraries. On average a young man or woman reads 24 books a year²⁷.

Undergraduate and graduate students are provided with stipends and hostel accommodation. A postgraduate receives 100 roubles a month, and under contract postgraduates may receive higher stipends at the discretion of the enterprise. For the last 40 years government expenditure on students' allowances have increased more than 20 times and now make up 2.4 billion roubles per year. An average grant amounts to 40–45 roubles a month, and students attaining high grades receive 15% more. There are also special grants instituted in

memory of prominent statesmen, scientists and writers, such as the Lenin, Lomonosov and Gorky stipends and other name grants in higher schools of Union Republics. These stipends are from 70 to 100 roubles. Students have many privileges granted by the state, such as meals provided at a discount of 50%, pay for hostel accommodation limited to 2–3 roubles per month (this covers fees for electricity, gas, furniture and bedclothes)²⁸. Nor does a student have to buy textbooks, these are available without cost in the school libraries. Students who study in the evenings and by correspondence while continuing to work are also given many privileges.

It is of course impossible to embrace the whole scope of contemporary educational problems in the USSR in a comparatively short paper; there are many problems which are still unsolved. The present paper covers the general features of the USSR education system which is in a state of change and search for new improved ways.

The authors would appreciate readers' comments and questions that will help them to prepare any possible follow-up papers, with due regard for the concrete wishes and proposals expressed.

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Association of Official Analytical Chemists (AOAC)

Notice of the 100th anniversary of AOAC was given in *CI*, 1983, No. 5, p. 34. This Centennial was celebrated by a series of meetings hosted by AOAC — the International Dairy Federation Chemical week, a meeting of ISO TC 134 on Fertilizers, Collaborative Analytical Pesticides Council Meeting (CIPAC), the 2nd International Conference on Harmonization of Collaborative Analytical Studies (see *CI*, 1985, No. 1, p. 23) and the 98th Annual International Meeting (of AOAC).

AOAC is, as you will know, an Associated Organization of IUPAC and to mark this centenary the Union President, Dr W. G. Schneider, presented a commemorative scroll to the President of AOAC, Dr C. W. Gehrke.

At the Annual International Meeting, 28 October–2 November 1984, the programme in-

cluded presentations by the Harvey W. Wiley award winner, Dr J. M. Bremner, Iowa State University; Peter Barton Hutt, Covington and Burlington; Dr Linus Pauling, Linus Pauling Institute; and Prof Cyril Ponnampерuma, University of Maryland. The meeting also included the scientific equipment exhibition, poster presentations and the following symposia: Sampling and Analysis of Fertilizers; Education in Modern Analytical Chemistry; Analysis of Pesticide Products for Impurities and Degradation Materials; Quality Assurance/Quality Control for Analytical Laboratories; Physical–Chemical Methods for Determining Antibiotic Residues in Tissues and Milk of Food Producing Animals; Environmental Toxicology and Chemical Analysis of Body Fluids; Storage, Handling, and Disposal of Hazardous Chemicals; and a Workshop on



Dr W. G. Schneider presents the commemorative scroll to Dr C. W. Gehrke, AOAC President.

Microcomputers and Integration of Scientific Information.

At the meeting AOAC approved 46 methods as Official First Action; of those 46 approved methods, 26 were food related, 7 were drug methods, and 7 were for pesticide formulations. More than 400 laboratories all over the world participated as volunteers in the collaborative studies leading to First Action approval of these methods. Registration was 1246, banquet attendance 285. The meeting included an exhibition of old scientific equipment and pictures of past meetings and officers.

After the meeting The Official Methods Board and Board of Directors approved *Guidelines for Interlaboratory Collaborative Studies Procedure to Validate Characteristics of Methods of Analysis*, including the two-tail Dixon Test, as AOAC operating guidelines for the design, conduct and evaluation of collaborative studies.

The AOAC Centennial celebration ends with the Spring Training Workshop, April 8–11, 1985 in Dallas, TX, USA.



THE INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY
presents its warm congratulations
to
THE ASSOCIATION OF
OFFICIAL ANALYTICAL CHEMISTS
on the occasion of its Centennial

From its foundation in 1884 the Association has pursued the development of precise and accurate methods for analysing food, feeds, agricultural and industrial chemicals, pharmaceuticals and forensic materials. It has established an international reputation of excellence in these fields and has pioneered the basis of measurement and control in public health, economic protection of the consumer and quality of the environment.

The International Union of Pure and Applied Chemistry is pleased to number the Association of Official Analytical Chemists among the scientific organizations with which it is associated, to recognize the important contributions which it continues to make in the above field and presents its best wishes for its continuing success.

October 1984

W. G. SCHNEIDER
President

Health and Safety in the Chemical Laboratory — Where do we go from here?

The viii + 198-page booklet comprises the proceedings of an international symposium, organized by the Royal Society of Chemistry under the aegis of the FECS Working Party on Professional Affairs, held at the University of Lancaster, UK, 12–13 April 1983. The bulk of the volume is taken up with the 14 papers given and subsequent discussion but on the final pages are listed the recommendations arising from the symposium, viz:

I. There is an immediate and continuing need for chemical societies to

- make the general public more aware that professional chemists are actively engaged in making chemistry safer;
- counter and discourage adverse media comments regarding health and safety in chemistry.

II. There is a longer term need for chemical societies to participate in the development of

- international harmonization of voluntary guidelines on health and safety;
- international standardization of definitions of accidents and of accident statistics together with a coordinated approach to obtaining detailed statistics on accidents and dangerous occurrences;
- national standardization (by governments if on a mandatory basis or by independent bodies if on an advisory basis) of evaluation of the cost effectiveness of control measures regarding health and safety;

- common procedures and minimum standards (possibly through special protocol committees) for health and safety in the workplace;
- common procedures for the identification of, and reporting on, the incidence of ill-health from work-related disease;
- training programmes in health and safety (possibly carried out by professional bodies) to be made available to small businesses.

III. There is a longer term need for

- an internationally accepted definition of a carcinogen to be established;
- morbidity and mortality studies to be conducted among professional workers other than chemists and among technical and manual workers; and for trades unions to conduct such studies among their members;
- reduced premiums to be charged by insurance companies to organizations with good health and safety records;
- greater collaboration on health and safety among professional bodies in the fields of chemistry and toxicology;
- greater awareness of toxicology to be included in the training of chemists.

The booklet is published by the Royal Society of Chemistry as Special Publication No. 51 and is priced at £16.50. ISBN 0-85186-945-9.

DIVISION PRESIDENTS

PROF C. H. BAMFORD

Macromolecular Division (IV)

Prof Clement H. Bamford was born in October 1912 in Stafford, UK, and after primary school attended the King Edward VI Grammar School. He became 'hooked' on chemistry at an early age (at primary school) after coming across a textbook belonging to his father and was obsessed with the subject throughout the rest of his schooldays. He attended Trinity College Cambridge and took the Natural Sciences Tripos, graduating BA in 1934. In 1937 he received his PhD for research into the photochemistry of carbonyl compounds and was awarded a Prize Fellowship at Trinity College. This was interrupted, in 1939, by the advent of World War II, for most of which he worked for the Special Operations Executive.

In 1945 Prof Bamford joined the long-term research laboratory established by the Courtaulds textile company as head of physical chemistry, becoming Director in 1947. This institute achieved considerable renown for its researches into high polymers, notably in the fields of polypeptides and free-radical polymerization. Pioneering work in the former led to the recognition of the α - and β -modifications and provided structural information leading to the recognition of the α -helix by Pauling. While at the Courtaulds laboratory, Prof Bamford obtained (1953) the ScD degree from the University of Cambridge.

He took the Campbell Brown Chair of Industrial Chemistry at the University of Liverpool in 1962. There his researches have been mainly concerned with polymers and polymerization, including solid-state polymerization, template polymerization, novel initiating systems based on transition metal derivatives and their applications in synthesizing block and graft copolymers, and reactions of complexed radicals in alternating copolymerization. Prof Bamford was



Prof C. H. Bamford, President, Macromolecular Division (IV).

elected to the Fellowship of the Royal Society in 1964. He was Dean of the Faculty of Science during 1965–68 and from 1972 to 1975 a Pro Vice-Chancellor of the University of Liverpool.

Prof Bamford joined the Macromolecular Division of IUPAC in 1972 as a National Representative on the Division Committee. He was elected a Titular Member in 1975, Vice-President in 1977 and became Division President in 1981.

A strong dislike of all forms of ball games from his early days on enabled the young Bamford to devote much time to violin playing — he did consider becoming a professional musician. It is a good thing for chemistry that he didn't but one wonders whether he and Prof Sunderman (*C/* 1984, No. 5, p. 36) should get together (at Lyon?).

10th CODATA Conference

The 10th International CODATA Conference — The Computer Handling and Dissemination of Data is to be held in Ottawa, Ontario, Canada, 14–17 July 1986. Major themes will be: Computerized data bases — Technology and management; Computer techniques in data and systems analysis; Numerical information systems in materials science, technology and industry; Numerical information processing in the biosciences; Numerical data processing and dissemination in the geosciences; and Data needs in industry. Official languages are English and French.

International Biosciences Networks (IBN)

The IBN was set up jointly by ICSU and UNESCO so that biologists throughout the world may contribute more effectively to a rapid application of recent advances in biological knowledge for the benefit of mankind. A document has been issued which explains the objectives, mode of operation and activities of IBN. There is also a section on long-term funding requirements and a list of IBN Secretariats is given. IUPAC is always invited to attend meetings of the International Steering Committee.

PROVISIONAL RECOMMENDATIONS

IUPAC seeks your comments

In *CI*, 1983, No. 5, 42–43, the details of a proposed revised procedure for comment and approval of recommendations on nomenclature and symbols were given. The system is now in operation and reproduced below is the synopsis of another Provisional Report to be processed in this way.

It must be emphasized that copies of the full report cannot be obtained from the IUPAC Secretariat but only from your own — or your nearest — national/regional centre. Copies will be sent on request, but on the understanding that comments will be sent, to the address on the document, not more than 8 months after publication of the synopsis in *CI*.

National/regional centres were listed in *CI*, 1985, No. 2, p. 13.

Specifications for infrared reference spectra of molecules in the vapour phase (*Provisional*)

This document supplies the specifications for the measurement, collection, presentation and storage of high-quality infrared reference spectra of materials in the vapour phase. The specifications include measurement and presentation, as hard copy, of infrared reference spectra of molecules in the vapour phase. Digital formatting recommended for storage of the reference data on magnetic tape is also described. An important outcome from adher-

ence to these specifications should be the ability readily to transfer digitally stored data from one site to another, and to enhance the quality of infrared spectral searching.

The specifications include details of instrument conditions to be used, sampling procedures, hard copy presentation of data, classification of data to facilitate later spectral searching, and recommendations for digital storage. A table summarizing the parameters for storing spectra on magnetic tape is presented.

Comments on these recommendations must be received by Dr J. G. Grasselli before the end of January 1986.

PURE AND APPLIED CHEMISTRY

The contents of recent and forthcoming issues of *PAC* are, or are expected to be:

Issue	Pages	Contents	Commission
Vol. 57 (1985) No. 4, April	543–599	Plenary and Symposium lectures presented at the 2nd International Congress on Automation and New Technology in the Clinical Laboratory, Barcelona, Spain, 15–18 October 1984	
	603–619	<i>Commission reports</i> Reporting physisorption data for gas/solid systems with special reference to the determination of surface area and porosity (<i>Recommendations 1984</i>)	I.6
	621–632	Reporting experimental pressure–area data with film balances (<i>Recommendations 1984</i>)	I.6
	633–638	Purification of solvents for electroanalysis: tetrahydrofuran and dioxane	V.5
No. 5, May	639–801	Main lectures presented at the 7th International Symposium on Carotenoids held in Munich, Federal Republic of Germany, 27–31 August 1985	

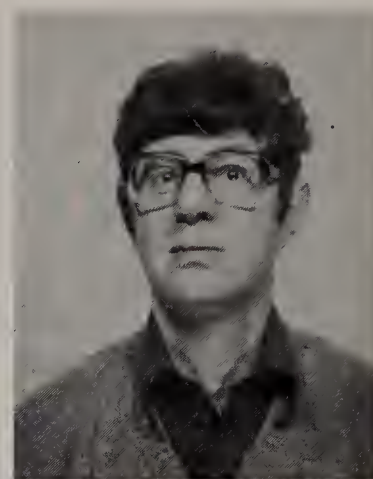
Group Numbering and the Periodic Table

by Dr G. J. Leigh
Commission II.2

The Periodic Table is one of the basic generalizations of the inorganic chemist, systematizing as it does a vast amount of chemical and physical information. That being so, it is surprising that ever since the complete Periodic Law was enunciated by Mendeleev in about 1869, there have been suggestions as how best to present the Table.

In a book written to celebrate the centenary of the Periodic Law, in 1969, van Spronsen¹ summarized the history of the Periodic system, both before and after Mendeleev, and one can only be dazzled by the ingenuity and enthusiasm exhibited by chemists in designing new Tables, in two and three dimensions, spiral, helical, cubic, fan-shaped, and even pretzel-shaped models have been suggested. The Commission on the Nomenclature of Inorganic Chemistry (Commission II.2, CNIC) regularly receives new Tables, and has just as regularly sent them back to the authors. The official position has been that this is not really a nomenclature matter. We are now under considerable pressure, however, to produce some form of Table which can be accepted widely and internationally because of confusing inconsistencies in usage. In the past, when it has been found necessary to use one for nomenclature purposes, an ill-defined long form has generally been used.²

If one examines the assembled galaxy of Tables in van Spronsen's book, one inconsistency becomes apparent, and this is not actually addressed by him. The Periodic Table is often written with Groups, and these Groups, familiar to every practising chemist, are not consistently designated. Sometimes they have no specific designation, sometimes they have dual symbol designations (for example, Groups IVA and IVB), sometimes IVA and IVB are combined into a single Group IV, etc., etc. This did not matter overmuch as long as no particular system gained favour. Eventually, however, two systems were adopted, and have become installed individually on opposite sides of the Atlantic. It became evident that some kind of decision had to be made since the situation was occasionally confusing. This has been discussed



Dr G. J. Leigh, Commission II.2.

admirably by Fernelius and Powell³ very recently.

The current (1970) edition of the IUPAC *Nomenclature of Inorganic Chemistry*⁴ does not specify any particular form of the Periodic Table. It does, however, leave it open to use letters to designate subgroups, as shown below.

1A	2A	3A	4A	5A	6A	7A
K	Cu	Si	Ti	V	Cr	Mn
Rb	Sr	Y	Zr	Nb	Mo	Tc
Cs	Ba	Lu	Hf	Ta	W	Re
Fr	Ra	Ac				
1B	2B	3B	4B	5B	6B	7B
Cu	Zn	Ga	Ge	As	Se	Br
Ag	Cd	In	Sn	Sb	Te	I
Au	Hg	Tl	Pb	Bi	Po	At

Although there are some discrepancies between this designation, the IUPAC format as presented by Fernelius and Powell,³ and the records of the relevant discussions, it is clear that the IUPAC format follows the general European usage. However, a usage has become established in the United States, essentially the converse of this, which describes the subgroups from titanium to manganese as B Groups and from boron to fluorine (i.e. including the lighter congeners) as A Groups.

CNIC has been under continuous pressure from sections of the chemical community to provide guidance and to suggest an internationally acceptable resolution to this problem. The

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac**															
		*Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
		**Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

Commission has discussed this problem at some length, and has also kept in close contact with the appropriate American Chemical Society (ACS) Committee. Consistent with the policy of attempting to discourage misleading practice and of providing a minimal amount of necessary guidance, the Commission has now adopted what is essentially a system due to Ölander,⁵ and one which, on a previous occasion, it had actually rejected. Presumably the Commission was not then fully aware of the amount of confusion which prevailed.

The IUPAC recommendation, which is as yet provisional, is set out above. The ACS recommendation is similar, but in addition Groups 3 to 12 carry a designator 'd' (for d-block elements) and the rare earths and actinides are designated '3f'. CNIC found this to be neither necessary nor, for the broadest applications, desirable. The IUPAC recommendation is necessary and sufficient to remove all confusion concerning A and B subgroups and eliminates decisions such as whether Be and Mg are within a subgroup or not. The position of hydrogen is, of course, arbitrary but CNIC would prefer it to be in Group 1. Any further designations, including the symbols 'd' and 'f' as recommended by the ACS, are

permissible, but are not recommended by IUPAC. CNIC does not intend to specify any form of the Periodic Table other than the long form with the Group symbols illustrated below.

It is understood that every chemist has his own views about the Table. In the UK, at least, many school teachers still favour a short form for teaching purposes.⁶ However, the Commission has the duty to rationalize and unify practice, while allowing individuals as much freedom as possible to express their own preferences. A long form of the Table with unique Group designations, while clearly not satisfying everyone, provides a minimal and wide basis for general international usage.

References

1. Van Spronsen, J. W., 1969. *The Periodic System of the Chemical Elements*, Elsevier, Amsterdam.
2. See, for example, Table IV in reference 4, p. 104.
3. Fernelius, W. C. & Powell, W. H., 1982. *J. Chem. Educ.*, **59**, 504.
4. *Nomenclature of Inorganic Chemistry 1970*. Butterworths, London, 1971.
5. A form with Group numbering 0–17 was copyrighted by A. Ölander in 1956, and was presented to IUPAC, to CNIC in 1964 and to IDCNS in 1973. See reference 3 for a fuller discussion.
6. Berry, M., 1985. *Chem. Brit.*, **21**, 147.

Modified Polymers

This 117-page booklet contains the ten main lectures delivered at the 6th Bratislava Conference on Modified Polymers, 2–5 July 1984. It is published by Hüthig and Wepf Verlag as Supplement No. 8 of *Die Makromolekulare Chemie* at US\$15, or US\$11 for subscribers to the journal and participants of the symposium.

KWIC Index

The first edition of the KWIC Index of international standards was published in 1983 and announced — and briefly explained — in *CI*, 1983, No. 5, p. 50. The second edition is now available from your national ISO sales agent or the ISO Central Secretariat in Geneva. In short, the Index contains the titles of all published standards from ISO and IEC and of documents resulting from the standardization activities of 27 other international bodies. Just to remind you — KWIC is derived from Key-Word-In-Context.

Separation and preconcentration of trace substances. IV — New type of flotation of ion-association compounds of complexes of multicharged anions with basic dyes (based on platinum metals as examples)

Sparingly soluble ion-association compounds, formed by multicharged anionic complexes (formed from trace amounts of an element to be preconcentrated and determined) and hydrophobic basic dyes, accumulate at the phase boundary after shaking with a solvent of low polarity. This type of flotation (without surfactant and gas bubbling) depends on the acidity, dyestuff and flotation agent. The separated compound can be determined by any suitable method. Combination of this separation technique with spectrophotometry allows a very sensitive determination, because 2–5 dye cations correspond to one atom of element in the multicharged anion. Examples of separation and determination of the six platinum metals (1–10 μg) prove the effectiveness and precision of the proposed technique.

This report, from Commission V.2, is provisionally scheduled for publication in the June 1985 issue of *PAC*.

Recommended methods for the purification of solvents and tests for impurities: Methanol and ethanol

This report deals with the purification of two commonly used alcohols. Specifications for the commercially available solvents and relevant physicochemical properties are given. The structures of the solvents are very briefly discussed, as are their key solvent properties, including the solubilities of common electrolytes. The procedures for the purification of methanol include the removal of water (distillation at a reduced pressure, passage over dried molecular sieves, and storage over calcium hydride, or, for immediate use, distillation over sodium), production of conductivity-grade solvent (reflux over magnesium, distillation, storage under nitrogen), and removal of bases and heavy metals (passage through a mixed-bed and a cation exchange column). Those for ethanol include removal of organic impurities (distillation from sulfuric acid and sodium hydroxide, then rectification), removal of water (reflux over calcium oxide, distillation, treatment with calcium hydride, reflux and distillation under hydrogen, or azeotropic distillation and passage over molecular sieves).

Organic impurities are best detected by gas

chromatography and heavy metals by flameless atomic absorption, water at >500 ppm by Karl Fischer titration, below this limit by special methods.

The report, from Commission V.5, is expected to be published in *PAC* in mid-1985.

Thermodynamic functions of transfer of single ions from water to nonaqueous and mixed solvents. Part 2: Enthalpies and entropies of transfer to nonaqueous solvents

Literature data on the enthalpies and entropies of transfer of single ions from water to nonaqueous solvents to the end of 1982 are compiled and evaluated. The extrathermodynamic assumption used by the original authors is reported. Those data, for which the tetraphenylarsonium tetraphenylborate (TATB) "reference electrolyte" assumption was not used for division into the individual ionic contribution, were assigned low weights in the evaluation. Other criteria were the reliability of the experimental data and the conformation to the additivity rule for appropriate cation and anion data to yield experimentally established electrolyte data. The entropy data were subjected to the additional criterion of giving with the enthalpy data the previously established Gibbs energy values. For 15 solvents both enthalpy and entropy data have been found, for 5 more only enthalpy data, and for 4 more only entropy data. Selected values are suggested on the basis of a weighted averaging of the reported data, according to the criteria presented above.

This report by Commission V.5 is provisionally scheduled for publication in *PAC* in August 1985.

Thermodynamic functions of transfer of single ions from water to nonaqueous and mixed solvents. Part 3: Standard potentials of selected electrodes

Standard electrode potentials at 298.15 K and their temperature coefficients are reported for the H^+/H_2 ; Li^+/Li ; Na^+/Na ; K^+/K ; Rb^+/Rb ; Cs^+/Cs ; Ag^+/Ag ; Tl^+/Tl ; and Cu^{++}/Cu cation/metal electrodes and the $\text{Cl}^-/\text{AgCl,Ag}$; $\text{Br}^-/\text{AgBr,Ag}$; $\text{I}^-/\text{AgI,Ag}$; $\text{CN}^-/\text{AgCN,Ag}$; $\text{SCN}^-/\text{AgSCN,Ag}$; and $\text{N}_3^-/\text{AgN}_3,\text{Ag}$ anion/silver salt, silver electrodes in twenty solvents. They have been calculated from the standard molar Gibbs energy and entropy of transfer of the relevant ions from water into these solvents and the standard electrode potentials and their temperature coefficients in water.

This report by Commission V.5 is provisionally scheduled for publication in *PAC* in August 1985.

NOMENCLATURE OF DERIVED QUANTITIES

Prepared by Mr J. C. Rigg, Prof B. F. Visser, and Dr H. P. Lehmann
Commission VII.2

1 Introduction

These proposals have been prepared, by the Commission VII.2 (Quantities and Units of Clinical Chemistry, CQUCC) and the Expert Panel on Quantities and Units (EPQU) of the International Federation of Clinical Chemistry (IFCC), as a result of difficulties encountered in their work because of a lack of systematic international and interdisciplinary names for several common kinds of quantities used in clinical chemistry. The nomenclature proposed here originated independently from present usage and has been modified after consultations within IUPAC and IFCC and with the Bureau International des Poids et Mesures (BIPM). Part of this document (Sections 2.2 and 2.3) describes existing practice, and part (most of Section 2.4) introduces terms new to the English language.

The proposals are the subject of current discussion within IUPAC and publication in *C/* is for the purpose of soliciting comments; it does not imply that official IUPAC approval has been or necessarily will be, given by IUPAC. Comments should be sent to Dr H. P. Lehmann, Department of Pathology, Louisiana State University Medical Center, 1901 Perdido Street, New Orleans, Louisiana 70112, USA; it would be convenient if a copy could also be sent to Dr R. B. Fox, Code 6120, US Naval Research Laboratory, Department of the Navy, Washington DC 20375, USA.

2 Names of quantities to indicate their logical meaning

2.1 The recommendations are based on the premise that systematic names should indicate the quantities in the numerator and denominator in the definition of a derived quantity.

2.2 The quantity in the numerator is designated by a word from the name of the quantity, as indicated by the following examples (with their French, German and Spanish equivalent, respectively):

2.2.1 NUMBER (OF ENTITIES); *nombre (d'entités), Anzahl (von Einzelheiten), número (de entes)*.

2.2.2 LENGTH; *longueur, Länge, longitud*.

2.2.3 AREA; *superficie (surface), Fläche, superficie*.

2.2.4 VOLUME; *volume, Volumen, volumen*.

2.2.5 MASS; *masse, Masse, masa*.

2.2.6 TIME; *temps, Zeit, tiempo*.

2.2.7 (AMOUNT OF) SUBSTANCE; *(quantité de) matière, Stoffmenge (cantidad de) substancia*.

2.2.8 TEMPERATURE; *chaleur, Wärme, calor*.

2.2.9 ENERGY; *énergie, Energie, energía*.

2.3 The systematic name of a quantity (x) derived from the quotient (the relationship between quantities obtained by division) of two quantities (y) of the same kind (i.e. $x = y_1/y_2$) includes:

- a word from the name of the defining quantity (y) (e.g. mass, volume),
- a word denoting the nature of the quotient (e.g. fraction).

The words recommended are in current use, and definitions are closely aligned to current usage.

2.3.1 RELATIVE; *relatif, relativ, relativo*. The quotient of quantities having the same kind of quantity, and preferentially the same component, in different systems. The denominator quantity is often called the reference quantity. Note: relative change in a quantity is denoted by $\Delta x/x$ or dx/x .

2.3.2 RATIO; *rapport, Verhältnis, relación*.

The quotient of quantities of the same kind for different components within the same system.

2.3.3 FRACTION; *fraction, Anteil, fracción*.

A quotient where the numerator quantity refers to a component while the denominator is a quantity of the same kind for the whole system. From the definition, a fraction has a value between zero and one.

2.4 The systematic name of a quantity derived from the quotient of two quantities of different kinds (i.e. $x = y/z$), includes:

- a word, or words, from the name for each defining kind of quantity in the numerator (i.e. y),
- a word for each defining kind of quantity in the denominator (i.e. z).

Except for rate and molar the proposed words, meaning “divided by . . .”, are new to the English language, because the names of the kinds of quantity (e.g. length, area, heat) are used in the numerator terms (Section 2.2). For example, the word area should be used in the name of a quantity with area as a numerator term (y) but not as a denominator term (z). Suitable words can be coined with the adjectival ending ‘-ic’ to a word indicating the defining kind of quantity. This was not possible for number, angle, and temperature, for which other words with clear association have been introduced instead.

2.4.1 ENTITIC; *entitique, zahlenbezogen, entésico*.

Divided by number of entities.

2.4.2 LINEIC; *linéique, längenbezogen, lineico*.

Divided by length.

2.4.3 AREIC; *surfacique, flächenbezogen, areico*.

Divided by area.

2.4.4 VOLUMIC; *volumique, volumenbezogen, volúmico*.

Divided by volume of the system. The numerator term of the definition must refer to the same (total) system.

Concentration is used if the numerator refers to a component of the system.

2.4.5 MASSIC; *massique, massenbezogen, másico*.

Divided by mass of the system. The numerator term of the definition must refer to the same (total) system. Content is used if the numerator refers to a component of the system.

2.4.6 RATE; *vitesse, Geschwindigkeit, rapidéz*.

Divided by time. A systematic name could be temporic, but rate is preferred because of its wide usage.

2.4.7 MOLAR; *molaire, molar, molar*.

Divided by amount of substance.

2.4.8 KELVIC; *kelvique, temperaturbezogen, termico*.

Divided by thermodynamic temperature.

2.4.9 By analogy, words are proposed for divided by pressure, plane angle and solid angle:

2.4.9.1 BARIC; *barique, drückbezogen, barico*.

Divided by pressure.

2.4.9.2 RADIC; *radique, winkelbezogen, radiánico*.

Divided by plane angle.

2.4.9.3 STERADIC; *stéradique, raumwinkelbezogen, esteradiánico*.

Divided by solid angle.

2.5 Examples of conventional names used for quantities and their systematic names are given in the Appendix.

3 Discussion

3.1 The names of quantities have evolved with the development of languages and with advances in knowledge and technology. Common names which can be found in general directories, for example activity, strength, load, level, density, differ from language to language, and almost invariably have a variety of meanings and associations.

3.2 In the preparation of a general recommendation¹ on quantities and units in clinical chemistry, we encountered several common kinds of quantity which had no international or interdisciplinary names. Most of these could be named by analogy with existing usages, and were approved by other groups within IUPAC and IFCC. However, more radical approaches proved necessary in the preparation of a recommendation on quantities in spectroscopy², and on consideration of changes in quantities with time. For both topics some quantities have several names, and a name may denote several kinds of quantity.

3.3 Differences in the nomenclature of some quantities were encountered between countries, between different scientific disciplines, and between different branches of the same scientific discipline. We have worked on the principle that nomenclature of quantities should be international and interdisciplinary, resorting to the specialized nomenclature of particular disciplines only for the specifications of the system studied and of relevant components.

3.4 A survey of existing nomenclature showed that derived kinds of quantities may have names without intrinsic meaning, names that indicate the property or process

studied or names that indicate the mathematical definition.

3.4.1 A word like absorption indicates a process. In the name of a quantity it is ambiguous and out of context, because spectroscopists would take it to refer to absorption of radiation, while a surface chemist might assume absorption (or adsorption) of a gas on to a solid.

3.4.2 In the nineteenth century, the word-endings '-ance' and '-ivity' were added, in the English language, to words for processes to indicate a property reflecting that process, for example absorbance, absorptance and absorptivity.

3.4.3 Even this range of word-endings is not sufficient to distinguish all the kinds of quantity describing absorption, and compound terms were coined, for example mass absorptivity, specific absorptivity, and molar absorptivity. Such names, however, may not indicate all the terms in the logical definition of the quantity.

3.5 Other names for derived kinds of quantity only partially indicate the mathematical definition.

3.5.1 Traditional words like density and specific are used for various quantities with different numerator terms and denominator terms. The user may feel that they imply a particular denominator term, for example 'divided by mass' for specific recommended by IUPAP³, section 1.4 of the IUPAC Manual⁴ and ISO⁵, and 'divided by volume' for density in ISO 31/10, section A 4.2⁶. However, these words are also used for quantities with other denominator terms in the definition. Thus, density may imply the following:

- divided by length, as in linear density,
- divided by area, as in population density,
- divided by volume, as in mass density or electron density,
- divided by an interval of a fixed variable, as in probability density,
- the ability of a system to

obstruct transmission or flow, as in optical density.

3.5.2 More certain in meaning, but again indistinctive, are the words factor and coefficient, which are similar in meaning to the word-endings '-ance' and '-ivity' respectively. Both words indicate quantities used in equations of proportionality⁷ 'factor' if the quantity has dimension one and 'coefficient' in other instances. Coefficient or '-ivity' may also indicate a material property, in contrast to '-ance' which denotes a sample property⁸.

3.5.3 Sometimes the names of derived quantities include the names, or adjectives, for terms used in their definition, for instance 'mass absorptivity' and 'mass density', and 'linear density' and 'linear expansion'. Such names indicate only one term of the definition and do not indicate whether that term forms part of the numerator or part of the denominator.

3.6 For quantities of dimension 1 (i.e. $x = y_1/y_2$), many existing names express the mathematical definition, e.g. mass fraction, volume ratio, relative length.

3.7 For quantities derived from two or more quantities of different kinds (i.e. $x = y/z$), few current names indicate the full meaning. The International Union of Pure and Applied Physics³ and the IUPAC Commission on Symbols, Terminology and Units⁴ recommend that 'molar' be used for 'divided by amount of substance' (e.g. molar mass). They recommend 'specific' for 'divided by mass' of the same system. However, practical usage is not limited to this recommendation, for example as in the use of specific volume and specific gravity which contain volume in the denominator.

3.8 In one instance, to denote quantities in a logical way, the International Committee on Radiological Units⁹, followed by ISO Technical Committee 12⁶ has introduced the word *fluence* to satisfy the need for an unequivocal word for 'divided by area'. However, this word is inappropriate in the contexts of surface chemistry and of many biological phenomena where there is no flow. In French, the word *surfactive*, in

- Dutch the word *areiek* and in Italian the word *areico*, have been introduced to define 'divided by area'. The IUPAC Commission on Colloid and Surface Chemistry¹⁰ introduced the names *areal* mass and *areal* amount of substance, where the word 'areal' was used for 'divided by area'.
- 3.9 French usage has introduced the word-ending '-ique' systematically to denote 'divided by. . .'. This practice avoids the difficulty of existing adjectives like 'linear' or 'thermal' that may indicate a numerator or denominator term.
- 3.10 Words for 'divided by time', 'divided by amount of substance', and 'divided by mass' have been introduced to meet

particular needs, without consideration of wider implications.

- 3.11 Within the last decade, the opinion grew that a small set of words could be used for construction of an endless variety of names for derived quantities, "The Chinese Restaurant Method".¹¹ The most systematic approach to date has been by Rupert & Latarjet¹², but it is complicated by the introduction of single words to indicate particular combinations of denominator terms. The nomenclature proposed here rests on the premise that the systematic name of a derived kind of quantity should indicate, unambiguously, the kinds of quantity in the numerator and the denominator of the definition.

Appendix: Examples of Systematic and Conventional Names

	Systematic Name	Conventional Name
N_B/N_1	number (of entities) fraction (of component B in system 1) (see note below)	per cent(age) (of B)/100
n_B/n_1	substance fraction (of component B in system 1)	mole fraction (of B)
m_B/m_1	mass fraction (of component B in system 1)	per cent(age) (of B)/100
m_B/m_C	mass ratio (of component B to component C)	ratio (B:C)
n_B/n_C	substance ratio (of component B to component C)	ratio (B:C)
l_B/l_C	length ratio (of component B to component C)	relative length/relative distance
t_B/t_C	time ratio (of component B to component C)	relative rate
$t_{B(0)}/t_{B(0)}$	relative time	relative rate
m_B/N_B	entitic mass (of substance B)	molecular (atomic) mass
V_B/N_B	entitic volume (of component B)	molecular (atomic) volume particle (cell) volume
m_B/n_B	molar mass (of substance B)	
m_1/v_1	volumic mass (of system 1)	density
$m_1 \cdot V_2/m_2 \cdot V_1$	relative volumic mass	relative density
V/m_1	massic volume (of system 1)	specific volume
m_B/V_1	mass concentration (of component B in system 1)	concentration
$m_B \cdot V_1/m_C \cdot V_1$	mass concentration ratio	relative concentration partition coefficient
n_B/V_1	substance concentration (of component B in system 1)	molar concentration
N_B/V_1	number (of entities) concentration (of component B in system 1)	count
n_B/m_1	substance content (of component B in system 1)	.
n_B/t	<i>substance rate (of substance B)</i>	<i>reaction rate, transfer-rate, activity</i>
m_B/t	mass rate (of substance B)	
	reaction rate, transfer rate	
V/t	volume rate	clearance, flow rate

Note: Examples of components and systems are given in reference 1.

References

Only publications cited in the text are listed. A fuller bibliography used in the analysis of current usages and recommendations is available from Mr J. C. Rigg, Centre for Agricultural Publishing & Documentation (Pudoc), PO Box 4, 6700 Wageningen, Netherlands.

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REPORTS PUBLISHED 1984

A list of reports published as a result of the activities of Commissions and special Committees during 1983 was presented in *CI*, 1984, *Supplement* (the *IUPAC Handbook 1983–1985*, pp. 171–174. Listed below, in similar style, are reports published during 1984. Please inform the Secretariat of any errors or omissions.

CHEMRAWN Committee

CHEMRAWN III — Resource Material Conversion: (Bio-)Chemical Process Bridges to meet Future Needs — The Hague, Netherlands, 25–29 June 1984:

Conference Working Papers: QLT Convention Services, 1984

Committee on Teaching of Chemistry (CTC)

International Newsletter on Chemical Education, No. 21, June 1984. Science Education through Self-reliance: The Commonwealth Foundation, 1984, iv + 21 pages

Teaching School Chemistry: UNESCO, 1984, 392 pages

IUB–IUPAC Joint Commission on Biochemical Nomenclature (JCBN)

Nomenclature and symbolism for amino acids and peptides — *Recommendations 1983*: *PAC* 1984, **56** (5), 595–624

PHYSICAL CHEMISTRY DIVISION (I)

Commission on Electrochemistry (I.3)

Recommendations on reporting electrode potentials in nonaqueous solvents: *PAC* 1984, **56** (4), 461–466

INORGANIC CHEMISTRY DIVISION (II)

Commission on Atomic Weights and Isotopic Abundances (II.1)

Atomic weights of the elements 1983: *PAC* 1984, **56** (6), 653–674

Isotopic compositions of the elements 1983: *PAC* 1984, **56** (6), 675–694

Element by element review of their atomic weights: *PAC* 1984, **56** (6), 695–768

Commission on High Temperature and Solid State Chemistry (II.3)

Results of a collaborative study on zirconia-based oxygen gauges: *PAC* 1984, **56** (8), 1069–1094

Bibliography on the High Temperature Chemistry and Physics of Materials: *PAC* 1984, **28** (1–4)

ORGANIC CHEMISTRY DIVISION (III)

Commission on Nomenclature of Organic Chemistry (III.1)

Treatment of variable valence in organic nomenclature (λ convention): *Recommendations 1983*: *PAC* 1984, **56** (6), 769–778

Commission on Photochemistry (III.3)

Recommended standards for reporting photochemical data — *Recommendations 1983*: PAC 1984, **56** (7), 939–944

MACROMOLECULAR DIVISION (IV)

Commission on Polymer Characterization and Properties (IV.2)

Molecular characterization of ethylene-propylene block copolymers: PAC 1984, **56** (5), 625–634

Viscoelastic properties of rubber-modified polymeric materials at elevated temperatures: PAC 1984, **56** (10), 1457–1475

ANALYTICAL CHEMISTRY DIVISION

Commission on Analytical Reactions and Reagents (V.1)

Spectrophotometric and fluorimetric determination of amines: PAC 1984, **56** (4), 467–477

Commission on Microchemical Techniques and Trace Analysis (V.2)

General aspects of trace analytical methods: VI — Acid pressure decomposition in trace element analysis: PAC 1984, **56** (4), 479–489

Critical evaluation of analytical methods for the determination of trace elements in various matrices — Part I: Determination of selenium in biological materials and water: PAC 1984, **56** (5), 645–651

Investigation of methods and sources of error in trace element analysis in surface waters using the determination of chromium and mercury as examples: PAC 1984, **56** (10), 1477–1498

Commission on Spectrochemical and Other Optical Procedures for Analysis (V.4)

Nomenclature, symbols, units and their usage in spectrochemical analysis:

VI — Molecular luminescence spectroscopy — *Recommendations 1983*: PAC 1984, **56** (2), 231–245

Commission on Electroanalytical Chemistry (V.5)

Diffusion coefficients of metals in mercury: PAC 1984, **56** (5), 635–644

Voltametry at glassy carbon electrodes: PAC 1984, **56** (8), 1095–1129

Commission on Equilibrium Data (V.6)

Critical evaluation of equilibrium constants in solution: Part A — Stability constants of metal complexes:

Critical survey of formation constants of complexes of histidine, phenylalanine, tyrosine, L-DOPA and tryptophan: PAC 1984, **56** (2), 247–292

Formation of metal complexes with ethylenediamine — A critical survey of equilibrium constants, enthalpy and entropy values: PAC 1984, **56** (4), 491–522

Commission on Analytical Radiochemistry and Nuclear Materials (V.7)

Radiochemical problems of fusion reactors: I — Facilities: PAC 1984, **56** (2), 293–299

Selected data on ion exchange separations in radioanalytical chemistry: PAC 1984, **56** (4), 523–539

Commission on Solubility Data (V.8)

Evaluation of the solubility of electrolytes from conductivity measurements: PAC 1984, **56** (4), 541–547

Solubility Data Series:

Vol. 15 — Alcohols with Water: Pergamon Press, 1984, xix + 438 pages

APPLIED CHEMISTRY DIVISION

Commission on Oils, Fats and Derivatives (VI.3)

Results of a collaborative study on determination of erucic acid: PAC 1984, **56** (2), 301–304

Commission on Pesticide Chemistry (VI.5)

Non-extractable pesticide residues in soils and plants: PAC 1984, **56** (7), 945–956

Improved cost-effective approaches to pesticide residues analysis: PAC 1984, **56** (8), 1131–1152

CLINICAL CHEMISTRY DIVISION (VII)

Commission on Quantities and Units in Clinical Chemistry (VII.2)

Physicochemical quantities and units in clinical chemistry with special emphasis on activities and activity coefficients — *Recommendations 1983*: PAC 1984, **56** (5), 567–594

Quantities and units in clinical chemistry:

Nebulizer and flame properties in flame emission and absorption spectrometry: PAC 1984, **56** (10), 1499–1504

Commission on Teaching (VII.3)

A basic education and training framework for medical laboratory techniques in clinical chemistry: PAC 1984, **56** (10), 1505–1510

Commission on Toxicology (VII.4)

Collection, processing and storage of specimens for biological monitoring of occupational exposure to toxic chemicals: PAC 1984, **56** (4), 549–566

β -2 Microglobulin and other urinary proteins as an index of cadmium-nephrotoxicity: PAC 1984, **56** (7), 957–965

SUMMARY MINUTES OF COMMITTEE AND COMMISSION MEETINGS

Committee on Teaching of Chemistry (CTC): London, UK, 22–23 July 1984

References are given to the full minutes of our meetings in Ljubljana (1977), Cassis (1978), Dublin (1979), Ljubljana (1980), Leuven (1981), Montpellier (1982), Lyngby (1983).

84/1 The composition of the Committee and National Representatives was noted.

84/2 It was agreed that the minutes of the last meeting of the Committee were a correct record.

84/3 International Newsletter on Chemical Education (INCE)

1. It was noted that the Newsletter No. 20 was published in December 1983. The Newsletter No. 21 will be received within the next few weeks.
2. The Chairman reported that 3000 copies of each Newsletter are produced and distributed in over 100 countries. 2000 copies are sent to teachers in non-IUPAC countries.
3. National Representatives (NRs) were urged to ask their national chemical societies to support financially the Newsletter. UNESCO will no longer give funds on a regular basis, only for certain issues of immediate interest to them.
4. Following a discussion in which he emphasized the very serious financial situation, the Chairman reported about the different possibilities to print INCE. It was decided to explore possibilities of printing the Newsletter in Hong Kong to save expense. This was as cheap a method as printing the Newsletter in *Chemistry International*.
5. It was noted that a new contract with UNESCO has been signed enabling the Committee to publish an issue of INCE devoted to the periodic classification.
6. Prof A. Pokrovski agreed to help in distributing copies of INCE through regional offices of UNESCO and to prepare a mailing list for regional offices, using the mailing list given by the Committee.
7. It was noted that in Brazil and Yugoslavia some parts of Newsletters were translated to facilitate their use by secondary teachers. The NRs reported about the dissemination of Newsletters in Austria, Canada, and Italy.

84/4 Teaching School Chemistry (77/5, 78/17, 79/12, 80/9, 81/8, 82/9, 83/5). It was noted that *Teaching School Chemistry* will be published in October in English, Spanish, French and Arabic.

84/5 Proceedings of the 7th International Conference on Chemical Education (ICCE) (82/19, 83/7)

The Secretary reported that the Proceedings will be completed in September and noted the difficulties due to the translation of the reports produced by the workshops. The Committee expressed their thanks to Profs A. Heikkinen and A. Rambaud for their work on the Proceedings.

84/6 8th ICCE, Tokyo, 1985 (82/20, 83/8)

Prof J. T. Shimozaawa gave a report on the preparation of the Conference. The first circular had already been sent and the second circular will be sent at the end of October. 600 participants are expected (100 from North America, 50 from Europe, 400 from Japan and 50 from other countries). The proposals for plenary and invited lecturers were discussed. The Committee emphasized the importance of moderate costs for secondary school teachers and for university teachers from many countries.

84/7 Safety Procedures in School (81/23, 82/16, 83/9)

The preparation of this booklet is part of the new contract signed with UNESCO. Mr T. Hitchings has obtained advice from correspondants and will produce a new draft by the end of July.

84/8 Maintenance of an international roster (82/7, 83/13)

It was decided to accept an offer of the IOCD Centre in Ljubljana to maintain the existing roster. Profs Gardner, Kornhauser and Samuel proposed criteria for selection of members to be included and a list of keywords proposed to describe the field of activity of the members.

84/9 Locally-produced equipment (97/7, 80/8, 81/15, 82/10, 83/15)

In May 1984, a regional workshop was held in Dhaka, Bangladesh, supported financially by UNESCO. Two more regional workshops are planned for 1984, one in Australia and the other in Sri Lanka. Prof Giesbrecht said that a follow-up to the workshop in São Paulo last year will take place in Brazil in November.

Dr Sane's booklet *Science Education Through Self-reliance* has been published by the Commonwealth Foundation. More than 200 pH meters and conductometers have now been fabricated by the Project team in Delhi and are being used in different universities worldwide.

84/10 Integrated Chemistry Subcommittee (81/9, 82/12, 83/11)

A report of a seminar on this subject held during the 7th ICCE will be in the Proceedings of the 7th

ICCE. After discussion on whether or not schoolteachers should be involved as the work covered by the Committee includes curricula in secondary schools, it was decided that it was better if the present terms of reference remained.

84/11 Role of chemistry departments in tertiary education

Prof Samuel emphasized the need for development of chemical education at the tertiary level and pointed out some domains where this need is great. A proposal was made by Prof Kornhauser that an IUPAC medal be given to tertiary teachers for excellence in teaching. Some countries already have such a system. NRs are asked to report on the situation in their countries.

84/12 Priorities in secondary school chemistry teaching

Prof Samuel cited five areas where problems are encountered and posed the problem of priorities for action for the next five years. Reports were given on progress being made in Austria and Norway. It was proposed that a special issue of the Newsletter on the problem of in-service training of teachers be prepared as well as another on the priorities in secondary school teaching.

84/13 Collaboration with UNESCO

A contract had been signed between CTC and UNESCO for three different actions. The first is supporting the planning and programme of the 8th ICCE in Tokyo. The second is production of a special issue of INCE on the periodic classification. The third is the production of a draft of a booklet on safety in school chemistry (see 84/7) and rules for technicians and new teachers. Collaboration between CTC and UNESCO on holding a seminar on microcomputers in secondary school teaching was discussed.

84/14 Collaboration with IOCD (83/18)

One domain of cooperation is the maintenance of the roster of chemical education (see 84/9).

A second proposal was accepted for a joint seminar — Good Chemistry at Low Cost — to be held in Ljubljana in September 1985.

84/15 Collaboration with other IUPAC bodies (83/21)

1. CHEMRAWN: Prof Gardner gave a report. It was suggested that CTC could use the large amount of information produced by CHEMRAWN to produce small booklets useful to teaching at secondary and tertiary levels.
2. Commission on Atomic Weights and Isotopic Abundances: A report was given by the Chairman. A Table of Atomic Weights to four significant figures prepared specially for schoolteachers is now available from D. J. Waddington.
3. Commission on Physicochemical Symbols, Terminology and Units: This Commission asked for comments from CTC on an abbreviated version of the Green Book. It was agreed that five members of the CTC will examine the draft and send comments to the Commission through the Secretary.

4. Clinical Chemistry Division: Prof Samuel reported on the role of chemists in medicinal centres. Chemists are often found too conservative to adapt quickly to new techniques. These problems could be discussed at CTC meetings at Tokyo and Lyon in 1985.

84/16 9th ICCE

The Chairman has received a proposal from the Netherlands to organize the 9th ICCE in 1987. The periodicity of the ICCE was discussed and the interval of two years was found satisfactory.

84/17 Date and venue of the next meeting

The next meeting of the CTC will be held in Lyon, September 2 and 3, during the General Assembly. An informal meeting will be held in Tokyo during the 8th ICCE.

M. Chastrette

IUPAC—IUB Joint Commission on Biochemical Nomenclature (JCBN): Bethesda, Maryland, USA, 2–4 May 1984

The meeting was held jointly with the Nomenclature Committee of the International Union of Biochemistry (IUB).

Amino acids and peptides

New recommendations have been published in *Biochem. J.*, **219**, 345–373, 1984, *Eur. J. Biochem.*, **138**, 9–37, 1984, and *PAC*, **56**, 595–624, 1984.

Carbohydrates, glycolipids and glycoproteins

Progress on the revision of the recommendations on carbohydrates and lipids, and the preparation of new recommendations on glycolipids was reported. The general carbohydrate recommendations were unlikely to be completed before the next meeting, but the other documents were progressing well and the glycoprotein recommendations were virtually complete. It was agreed that it would be useful for all of these recommendations to be supplemented by a one-letter code for representing carbohydrate structures compactly, and a separate document would be prepared. Although it was originally intended that glycolipids should be considered within the general revision of the lipid recommendations, they would now be dealt with separately, and a new panel would be set up to consider other aspects of lipids.

Steroids

Revision of the existing recommendations was progressing and should be completed in 1985. Triterpenes would not be included as they would be dealt with by Commission III. A list of the most commonly encountered International Non-Proprietary Names for steroids would be included.

Neurotransmitters and their analogues (formerly 'catecholamines')

Illness had prevented any progress from being made

since 1983, but it was hoped that a document would be ready for discussion in 1985.

Prostaglandins and thromboxanes

Expert comments on the proposed recommendations were currently being received, and would be considered by Commission III in July 1984.

Newsletter

An abridged version of the Newsletter prepared jointly with the Nomenclature Committee of IUB had been published in *CI* 1984, No. 3, pp. 24–25. In future, a separate JCBN Newsletter based on the joint Newsletter would be prepared for publication in *CI*.

Nomenclature Committee of IUB

JCBN contributed to the discussion of various IUB matters, including the finalization of a new edition of *Enzyme Nomenclature*, due to be published by Academic Press, New York, before the end of 1984, and the preparation of a document on a one-letter code for representing ambiguities and uncertainties in nucleic acid sequences. The latter document was to be submitted to IUB for approval with a view to publication during 1985.

Next Meeting

The next meeting would be in Utrecht, the Netherlands, 19–22 May 1985, and would be a joint meeting with the Nomenclature Committee of IUB.

Athel Cornish-Bowden

Physical Chemistry Division Committee.

Subcommittee on Plasma Chemistry:

Tilton, NH, USA, 16 August 1984

Status of preparations for ISPC-7

Dr C. De Vries reported (on behalf of Prof Schram) on the status of arrangements for the 7th International Symposium on Plasma Chemistry (ISPC-7). Good progress was being made and the second circular should be out before 15 September.* There was considerable discussion on the possibilities of Subcommittee involvement in the associated short courses. It was finally agreed that it should be involved: Profs M. Boulos and P. Fauchais were asked to take care of the thermal plasma course and Drs D. Flamm and K. Herb of the low-pressure plasma course. Subcommittee members were invited to comment on the short courses to the four delegated people in charge. The latter should contact the local organizing committee in the Netherlands after Prof Schram has been informed of the Subcommittee action. Announcement of these short courses in conjunction with ISPC-7 mailings could only be done after the Subcommittee's approval.

In connection with short courses the question of possible conflict of interest by offerings from colleagues from the industrial community was raised.

Potential organizers and location of ISPC-8

Proposals, with varying degrees of detail, were made for locating ISPC-8 in Israel, Italy, Japan or Switzerland. In connection with future conferences, Dr S. Vepřek read a letter from Prof Suhr urging organizers of future conferences to keep the fees at a reasonable level (regular US\$100, students US\$10). Recommendations were also made to invite, well in advance, people from Eastern-block countries who can make interesting contributions; financial support should be provided if necessary and if possible.

The Subcommittee decided to select Japan as the site for ISPC-8, provided that the Japanese organizing committee could meet stipulated maximal amounts for conference fee and accommodation costs. It was decided, by a majority vote, to leave the workshops associated with ISPC-8 in the hands of the Japanese local organizing committee who would be asked to have details of their plans ready for the next Subcommittee meeting.

Subcommittee activities

Dr Gouesbest: *Solid particles velocity measurements in thermal plasmas*. Reviewed and approved.

Prof H. Suhr: Supplement III of the *Bibliography on plasma chemistry* is pending. It was suggested that issue of the *Bibliography* should stop because of the availability of computer-aided literature search systems.

Prof W. Lindinger: Report on *Mass spectrometry in low density plasmas* is pending.

Prof R. D'Agostino: No authors had yet been found for the projected report *Diagnostics of non-equilibrium discharges*.

Dr D. Flamm: The report *Diagnostics of discharges utilized or etching and deposition of polymer and inorganic films* would be prepared by D'Agostino and Flamm.

Publications

The Subcommittee Chairman would request the Division President, Dr D. Lide, that reviewing of Subcommittee reports within IUPAC should not exceed 5 months. If this request cannot be met, publication somewhere else as an IUPAC Subcommittee report should be considered.

S. Vepřek

*Updating: The response to the call for papers was overwhelming. The third circular with the confirmation of the acceptance of the papers was sent out in February 1985.

Commission V.1 — Analytical Reactions and Reagents: Mogilany, Poland, 1–3 September 1984

The Commission met and was accommodated in splendid style in the Polish Academy of Science House and thanks the Academy for the hospitality displayed. A great deal of time was spent on consideration of changes in membership due to take

place in Lyon and the new projects made possible by such changes.

The Commission completed its work on the Divisional Project on the Selected Trace Elements in Water and the final manuscript should by now be in the Division's editorial hands — Profs A. Hulanicki, G. den Boef and D. T. Burns having completed their editorial tasks. Manuscripts of the reports of *Characterization of spectrophotometric methods* and *Characterizations of purity control of acid-base indicators* have been submitted for approval. Progress was made on the current projects Metal Buffers, Organic Analytical Reagents and Characterization of Stationary Phases for GLC.

A preliminary discussion was held concerning the new project Pattern Recognition and it was agreed to hold joint discussions with Commission V.3 on this subject.

It was noted that Commission V.1 was 50 years old. Assistance of all past and present Members is sought with material to produce a brief history.

Note: We can recommend the Academy House at Mogilany, an elegant country house in pleasant and quiet rural district, as a venue most productive of scientific discussion and interchange of ideas.

D. Thorburn Burns

Commission V.2 — Microchemical Techniques and Trace Analysis: Cracow, Poland, 25 August 1984

1. New National Representatives

The following were approved as new National Representatives: Prof Ni Zhe-Ming (China), Prof Leroy (France), Dr E. A. Terent'eva (USSR). Dr B. Salbu (Norway) was again confirmed as a National Representative.

2. Reports Completed

- (a) *Nomenclature, Symbols and Units Recommended for In-situ Microanalysis* (Grasserbauer, Heinrich, Morrison). The provisional published report (*PAC* Vol. 55, pp. 2023–2027, 1983) had stimulated just one comment, from Prof D. T. Burns, suggesting contact with Dr Powell (NBS, USA), Chairman of the ASIM-E42 Committee, to establish cooperation in topics concerning nomenclature in surface analysis. Prof Grasserbauer had acted on this suggestion, and his action was approved. The report therefore is finally accepted.
- (b) *Separation and Preconcentration of Trace Substances*.
- II. *Precipitation of Major Constituents for Trace Preconcentrations: Potential and Problems* (Jackwerth, Townshend). The report had been amended in the light of comments by Commission members, and the revised version had been submitted to the Division Committee. (Since this

meeting, several comments have been received, and a revised version is being prepared by Prof Townshend for publication).

- IV. *A New Type of Preconcentration of Trace Elements: Interphase Collection (Flotation) of Ion-Associates of Multicharged Anionic Complexes of Platinum Metals with Basic Dyes* (Marczenko). This report had been submitted to the Division Committee. (Since the meeting, several comments have been received, and publication of a suitably modified version has been approved by Prof Pellerin.)
- (c) *General Aspects of Trace Analytical Methods*.
- VI. *Acid pressure Decomposition in trace Element Analysis* (Jackwerth, Gomišček). This report had been published in *PAC*, Vol. 56, pp. 479–489, (1984).
- (d) *Critical Evaluation of Analytical Methods for the Determination of Trace Elements in Various Matrices*.
- I. *Selenium in Biological Materials and Water* (Campbell). This report had been published in *PAC*, Vol. 56, pp. 645–651 (1984).
- II. *Cobalt in Biological Materials* (Townshend). The approved report is shortly to be submitted to the Division Committee.
- III. *Molybdenum in Biological Materials* (Marczenko). Prof Townshend was editing the report before submission to the Division Committee.
- IV. *Chromium in Biological Materials* (Ottaway). The amended report was nearly ready to submit to the Division Committee.
- (e) *Division Project*.
- I. *Investigation of Methods of Error in Trace Element Analysis in Surface Waters using the Determination of Chromium and Mercury as Examples* (Griepink).
- II. *Some General Considerations Concerning Accuracy and Precision in Trace Metal Analysis in Water* (Griepink). Report II had been lost in the Division Committee, but had reappeared, with Division approval, and will soon be available for publication. Report I was published in *PAC*, Vol. 56, pp. 1477–1498 (1984).
- ### **3. Current Projects**
- (a) *Critical Evaluation of Analytical Methods for the Determination of Trace Elements in Various Matrices*.
- V. *Thallium in Various Matrices* (1979, Tölg, Griepink). The manuscript had been sent to Prof Townshend for linguistic improvement, after which it would be circulated to Commission Members.
- VI. *Trace Analysis of Semiconductor Materials* (1981): Part A. Bulk Analysis (Zolotov, Karpov). Part B. Distribution

Analysis (Grasserbauer, Morrison and Stinger). Both parts were approved by the Commission for submission to the Division Committee, after incorporation of comments received. Grasserbauer would submit the documents to Prof den Boef.

- VII. Manganese in Biological Materials (1981, Ottaway). Prof Ottaway would submit a draft report before the Lyon meeting.
 - VIII. Fluorine in Various Matrices (1982, Campbell). A draft report was tabled. Comments were requested by June 1985.
 - IX. Aluminium in Biological Matrices (1983, Cedergren). Prof Cedergren would distribute a draft report before the Lyon meeting. As there was considerable overlap with Commission VII.4, Prof Cedergren would collaborate with Dr Savory, Chairman of that Commission, in this project, and would focus on sample decomposition methods, especially coupled to graphite furnace a.a.s.
- (b) Separation and Preconcentration of Trace Substances
- V. Microscale Preconcentration Techniques for Trace Analysis (1983, Mizuike, Tölg, Zolotov). An outline was expected early in 1985, based on material from Prof Mizuike augmented by Prof Zolotov, subject to the agreement of Prof Tölg.
 - VI. Aspects of Combination of Preconcentration and Determination in Trace Analysis (1983, Jackwerth, Tölg, Zolotov). A first draft was considered to be too long; revised material would be available in May 1985.
- (c) Standards and Calibration Methods for Surface Analysis
- I. Semiconductors (1981, Working Group on Surface Analysis). The draft proposals were considered to be excellent and were adopted. Reports would be ready for discussion at Lyon.
- (d) Organic Trace Analysis (Working Group on Organic Trace Analysis). The report of a meeting of the Working Group held in May 1984 was considered, and thought to indicate good progress. However, the Members present were concerned that the first two topics mentioned in the report, namely detection methods for qualitative and quantitative gas chromatographic analysis, and liquid chromatography, were very wide and might never be completed. It was recommended that more specific areas should be tackled, and that the first reports should be available before the Lyon meeting. Prof Janák would be asked to join the Working Party.
- (e) Survey of Decomposition Methods in Elemental Trace Analysis (1980, Griepink, Tölg). Dr Griepink, having received comments on his draft outline, would present, in conjunc-

tion with Prof Tölg, a draft report before the Lyon meeting.

- (f) Reference Materials for Trace Analysis (1983, Griepink). There had been some correspondence between Dr Griepink and Prof Sankar Das, and a draft report might be available for discussion at Lyon.

4. New Projects

The following were suggested:

- (a) Selected Recommended Methods for Preconcentration and Separation of Various Elements (Marczenko). Prof Marczenko would draft an introductory text, and contact Profs Jackwerth, Tölg, Zolotov and Mizuike and Dr Griepink. The text would be considered at the Lyon meeting.
- (b) Critical Evaluation of Analytical Methods for the Determination of Trace Elements in Various Matrices (Ottaway). (i) Vanadium in Biological Materials. (ii) Lead and Cadmium in Food (in conjunction with Commission VI.2).
- (c) Evaluation of Size Fractionation Techniques (Salbu).
Two-page outlines of (b) and (c) would be presented at Lyon. The desirability of these projects will be considered at the Lyon meeting, as well as the initiation of projects in Speciation, which could involve Prof K. Fuwa.

5. The Use of Ion Chromatography for Anion Analysis in Aqueous Samples

A position paper on this joint project with V.5 had been produced by Prof Grushka, and Prof Zolotov had sent some comments to the author.

6. Next meeting

This will take place during the General Assembly at Lyon (France).

A. Townshend

Commission VI.1 — Food Chemistry: Washington, DC, USA, 22–24 October 1984

The Commission has been restructured to include six Titular Members and ten Associate Members each of whom chairs a Working Group covering a specific area of food chemistry of interest to the Commission. The ten Working Groups are: Mycotoxins, Aquatic Biotoxins, Animal Drugs, Direct Food Additives, Polycyclic Aromatic Hydrocarbons, Nitrosamines, Elemental Analysis, Natural Toxicants, Halogenated Hydrocarbon Environmental Contaminants, and Effects of Food Processing. Over the past year Function Statements have been prepared for each Working Group and a series of project proposals have been developed. These

projects, as well as previously approved projects, were discussed at the meeting.

Projects completed, with the production of reports, were: Chemical Determination of *Fusarium* Mycotoxins in Food and Feeds; Determination of Mercury in Food; and *N*-Heterocyclic Carcinogens in Foods. Still in progress are four projects: Check Sample Survey for Mycotoxins; Fluoride in Food; Development of a Method for the Determination of Total Nitroso Compounds in Foods; and Rapid Preselection Method for Benzo(α)pyrene.

Two current projects have been revised (former titles in brackets): Collaborative Study of a TLC/HPTLC and HPLC Method for Ochratoxin A in Barley, Corn and Tissue (Determination of Ochratoxin Residues in Meat); and Determination of Selenium Content of Foods and Biological Materials (Determination of Selenium in Food). A large

number of possible new projects were discussed; of these 14 were initiated and 2 approved.

As part of the agenda of the meeting, a mini-symposium was held with some of the former Commission Chairmen as speakers. It is our intent to develop an historical record of the Commission's activities which will give clear support and direction for future programs.

The Commission will sponsor the 7th IUPAC Symposium on Mycotoxins and Phycotoxins, 22–25 July 1985, in Pretoria, South Africa. The second announcement (9000 circulars) has been distributed; all other meeting arrangements are well in hand and we have every reason to expect a successful, productive conference.

A. E. Pohland

A Brief Report from Commission I.1

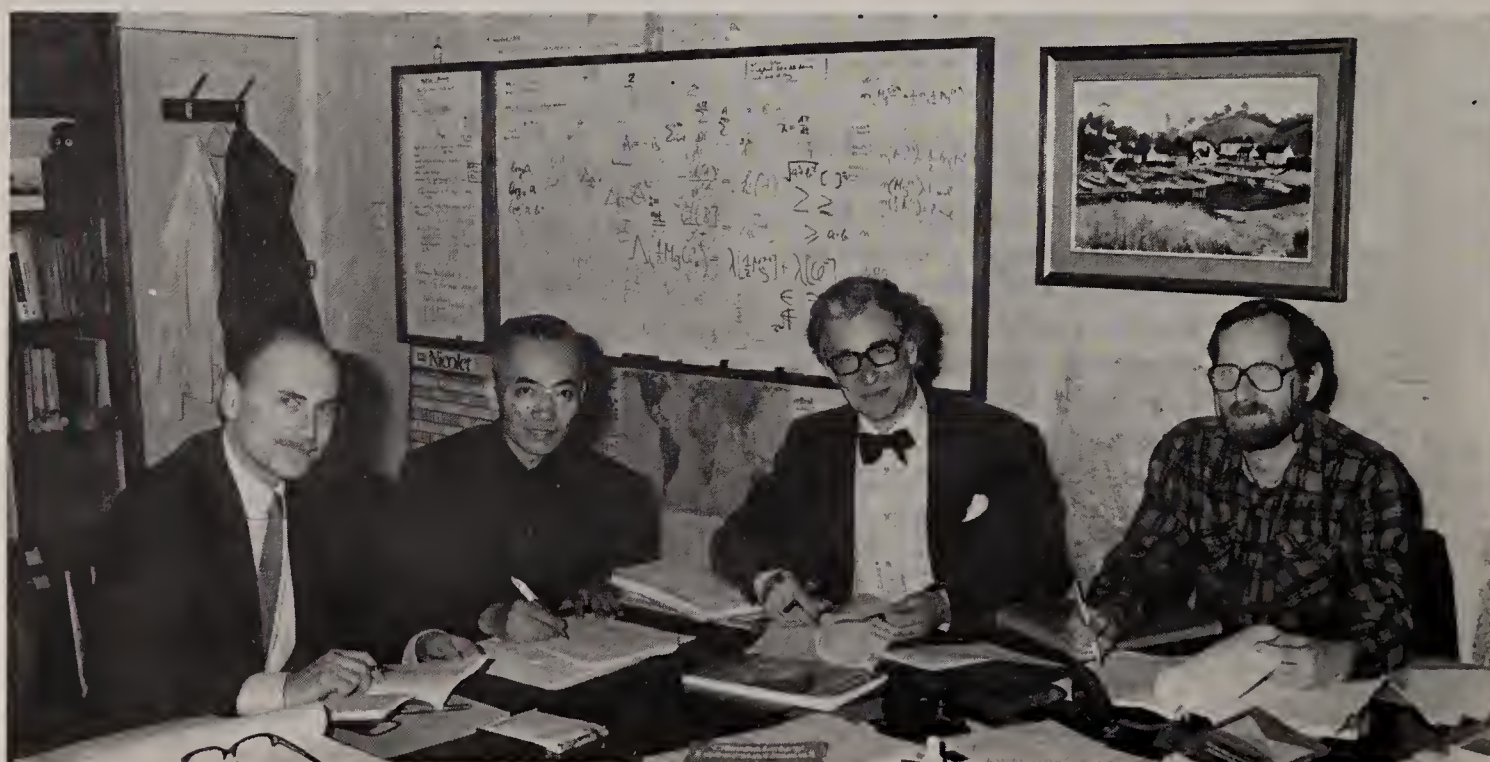
IUPAC Commission I.1, on Physicochemical Symbols, Terminology and Units, is working steadily towards a further revision of the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* (the "Green Book"). The new edition will have the simpler title *Quantities, Units and Symbols in Physical Chemistry*, and it will incorporate a number of changes intended to make it more popular and more useful to the scientific community, while maintaining the authority of the earlier editions and consistency with the recommendations of ISO, BIPM and IUPAP.

A working party of Commission I.1, consisting of Prof Kozo Kuchitsu (from Tokyo, Chairman), and Profs Klaus Homann (Darmstadt), Nikola

Kallay (Zagreb) and Ian Mills (Reading), met in Reading, 4–7 March 1985, to work on the details of the new manual. It is hoped that a carefully revised draft will be available for discussion at the IUPAC General Assembly in Lyon, in September this year, and that the new edition will finally be published sometime next year. An abbreviated form of the manual is also being prepared in parallel with this work, and should be published at the same time.

The photograph shows, left to right, Klaus Homann, Kozo Kuchitsu, Ian Mills and Nikola Kallay working on the manual in Ian Mills' office at Reading.

Ian M. Mills



The Commission I.1 working party working.

Instructions for Preparation of Manuscripts of Provisional Nomenclature Reports

MANDATORY REQUIREMENT BY IDCNS

The revised procedure for comment and approval of IUPAC recommendations on nomenclature and symbols (see *Supplement 1984 to CI*, p. 121) has been fully implemented since the 32nd IUPAC General Assembly, Lyngby, August 1983. Several provisional nomenclature recommendations, after approval by IDCNS, have been available through national/regional centres (for complete list see *CI*, 1985, No. 2, pp. 12–13). These centres make further photocopies for distribution after receiving one from the Secretariat. In some cases the original manuscript received at the Secretariat is of poor reproduction quality (uneven typing, handwritten inserts — some in margins, longer/shorter pages, etc.) with the result that by the time it reaches the end-user, its quality is so poor that reading it is a problem and suggesting comments totally uninspiring. Consequently, the object of the exercise is lost in these cases. **In future IDCNS will not recommend sending manuscripts of poor reproduction quality to national/regional centres.**

SUGGESTIONS OF THE SCIENTIFIC PUBLICATIONS SECRETARY

When the report is eventually approved for publication you will be saved from the trouble of re-typing if you style it right from the start in accordance with Notes for Contributors to IUPAC Publications. These are available free-of-charge from Mr Edward Wates, Journals Production Manager, Blackwell Scientific Publications Ltd, Osney Mead, Oxford OX2 0EL, UK.

The paper and typing area

The report should be typed on large and thick sheets of white paper, preferably 250 mm (across) × 353 mm (deep), commonly known as B4 paper. If this size paper is not available, use the one which exceeds the typing area: 197 mm (across) × 310 mm (deep). This area is in fact the typing area of IUPAC–Blackwell (formerly IUPAC–Pergamon) laysheets.

The advantages of this typing area are:

1. Photo-reduced (to 80%) copies can be prepared on photocopying machines both in North America (common paper size: 210 mm across × 280 mm deep), elsewhere (common paper size A4, namely 210 mm across × 297 mm deep) as well as at the Secretariat.
2. Typing in the area of IUPAC–Blackwell laysheets has the advantage that if only minor changes need to be made after receipt of comments they can be incorporated relatively easily without the need to re-type the whole report for eventual publication in *Pure and Applied Chemistry*. The publisher will arrange for the ordinary sheets to be stuck on the laysheets.
3. With the larger sheets the report will need fewer pages, thus reducing the costs of postage and photocopying.
4. The typing area is suitable for most word-processors and printers, but please do not use a dot-matrix printer.

Typing text and summary

The report should be typed with SINGLE spacing. If it has a large number of subscripts and/or superscripts, please type leaving 1½ or 2 spaces between lines. Double spaces should be left above and below the sub-headings even when the manuscript is typed with single spacing.

A 200-word summary for each report is needed for publication in *Chemistry International* and for providing to the national/regional centres. Why not type the summary at the start of the report — indented 20 mm from the left-hand margin?

Typing symbols and units

Symbols for units must be typed in roman (upright). Symbols for physicochemical quantities must, however, be typed in italic (sloping). Underlining to indicate italic is not satisfactory for symbols. If you do not have access to a golf-ball typewriter or your word-processor does not have the facility for italic typing, please use direct transfer letters (Letraset, Alfacs, etc.); even italic Greek letters are available, particularly from Alfacs.

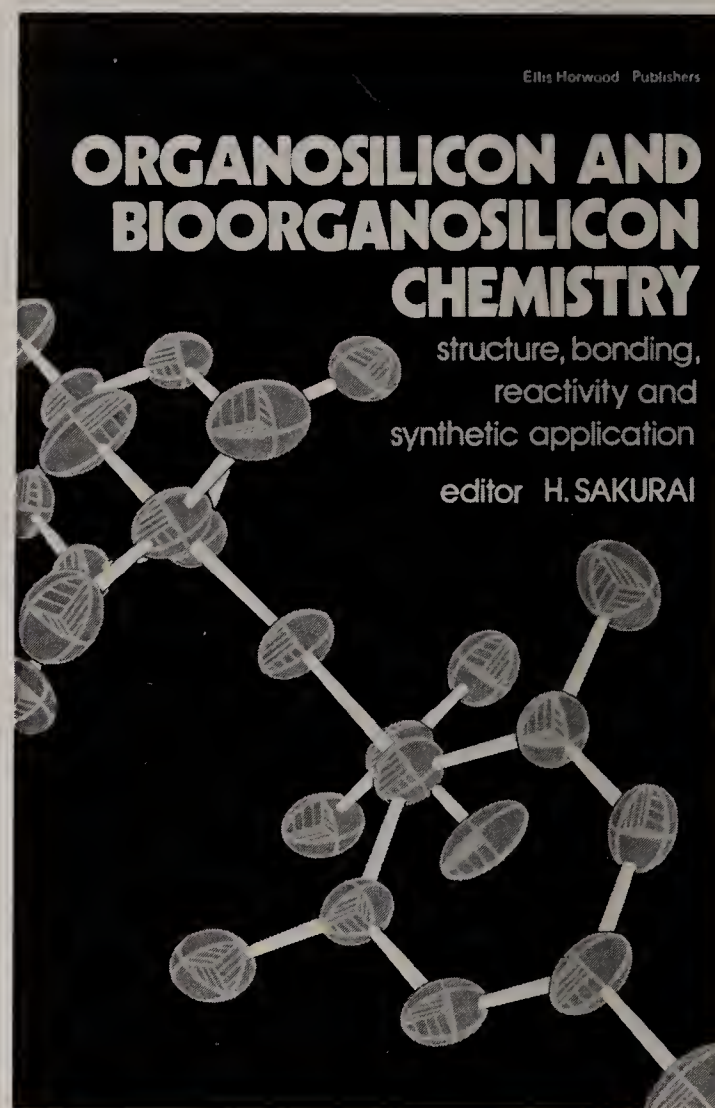
P. D. Gujral

IUPAC PUBLICATIONS

Organosilicon and Bioorganosilicon Chemistry: Structure, Bonding, Reactivity and Synthetic Application

Edited by Prof Hideki Sakurai the above book constitutes the proceedings of the 7th International Symposium on Organosilicon Chemistry held in Kyoto in September 1984 under the sponsorship of IUPAC and organized by The Chemical Society of Japan. The 27 chapters, based on main lectures, are presented in five parts: (i) Stable silicon double bonds; (ii) Theoretical approach and reactive intermediates; (iii) Reaction mechanism and new compounds; (iv) Silicon in organic synthesis; and (v) Bioorganosilicon chemistry and further applications.

Published on behalf of IUPAC by Ellis Horwood Ltd, Market Cross House, Cooper Street, Chichester, West Sussex PO19 1EB, UK and distributed outside UK by John Wiley & Sons/Halsted Press. ISBN 0-85312-845-6 (Ellis Horwood Ltd); ISBN 0-470-20188-6 (Halsted Press). Hardbound, 298 pp., Index, price in UK £35.00, price overseas US\$45.00.



Solubility Data Series, Vol. 19. Cumulative Index Volumes 1-18

Preface

This CUMULATIVE INDEX for the first eighteen volumes of the Solubility Data Series has been produced in the hope that it will enable workers to locate data for a system of interest together with data on closely related systems without the necessity of consulting several indexes of individual volumes.

Further cumulative indexes will be issued after a reasonable number of additional volumes in the series have been published. Publication of a COMPREHENSIVE CUMULATIVE INDEX is planned at the end of the complete series of some 100 volumes. The editor would welcome comments on any aspects of the present cumulative index.

The index consists of three sections, a System index, an Author index and a Chemical Registry Number index. The system index is arranged in a similar manner to the system indexes in individual volumes. Page numbers preceded by E refer to evaluation text whereas those not preceded by E

refer to compiled tables. In general, compounds are indexed as listed in *Chemical Abstracts*: for example toluene is listed as Benzene, methyl-; and dimethylsulfoxide is listed as Methane, sulfinylbis-. Gas-liquid systems are listed by solvent. Solid-liquid systems are listed under the solid but not usually under the solvent as well. Liquid-liquid systems appear only in volume 15 and are listed under the alcohol not under water.

I am indebted to members of the Commission on Solubility Data and editors of the individual volumes for suggestions and their help in checking parts of the indexes. The help of Jane Chipperfield and James Young in production of the index is gratefully acknowledged.

C. L. Young

This volume is available from Pergamon Press, price US\$100.

Solubility Data Series, Vol. 20. Halogenated Benzenes, Toluenes and Phenols with Water

This is Vol. 20 of a series of comprehensive critical compilations of data on solubilities of title compounds with light and heavy water.

The solubility data reported in the scientific literature have been compiled and the solubility values have been critically examined over a range of temperatures. When several investigations have been found, the data have been correlated and smoothed before being presented in tables. The solubilities are always given in the reported units as well as, through recalculation, in moles or weight per unit volume or mass, as appropriate, and in mole fraction units.

When applicable, the solubilities are also presented in graphs, illustrating the discrepancies among the experimental data and the trends for temperature dependence. The effect of pressure on liquid-liquid solubility has been reported only for the 1,4- $\text{C}_6\text{H}_4\text{F}_2\text{-H}_2\text{O}$ system.

After the introductory pages on the theoretical principles of solubility with water, there are 257 pages of data on halogenated benzenes, toluenes and phenols with water systems. The compounds are listed according to the Hill System for quick allocation and retrieval. The volume ends with three types of indices: a system index, a registry number index and an author index. It is available from Pergamon Press, price US\$100.

Teaching school chemistry

This 392-page book, edited by D. J. Waddington and published by UNESCO, was very much the concern of the IUPAC Committee on Teaching of Chemistry. It was prepared as a part of UNESCO's programme to improve the teaching of science through the production of resource materials for those working in the field.

The book has been produced by a selection of authors from different regions and countries of the world. Each chapter has been reviewed and revised by many chemistry teachers in many Member States of UNESCO, thus it is hoped that the book will be of help in further improvement of chemistry teaching at the secondary and tertiary levels.

The titles of the eight chapters are:

- The changing face of chemistry
- Curriculum innovation in school chemistry
- Some methods in teaching chemistry: four studies
- Practical work and technology in chemical education: three aspects
- Assessment of students
- Education and training of teachers
- Current research in chemical education
- The future

The book is available from UNESCO (or local appointed bookshops) in Arabic (ISBN 92-3-602131-x), English (ISBN 92-3-102131-1), French (ISBN 92-3-202131-5) or Spanish (ISBN 92-3-302131-9).

IUPAC PEOPLE

We regret to record the death of:

Dr B. Sandberg, Sweden (26 September 1984) — Secretary General of 13th IUPAC Congress (Stockholm, 1953), Swedish Delegation to IUPAC Council (1955, 1963, 1965, 1983).

Dr R. W. Cairns, USA (27 January 1985) — President of IUPAC (1975–77), President of Applied Chemistry Division (1971–75), Macromolecular Division Committee (1967–73).



The late Dr R. W. Cairns.

Lyon

Lyon lies at the confluence of two great rivers, the Saône and the Rhône, and occupies both the narrow peninsula between the rivers and their opposite banks. It is not, therefore, surprising that it has 27 bridges.

A Roman colony, *Copia Lugdunum*, was founded on the hill above the confluence, Fourvière, in 43 BC and was the home of several emperors. Christianity reached Lyon in the 2nd Century but subsequent persecution of Christians resulted in the almost complete destruction of the town. In the 5th Century however, the area came under the influence of the Burgundians who made Lyon their capital in 470. The town prospered and became an important seat of the Holy Roman empire. In 1312 the town was annexed to the French crown and remained faithful to the King during the Hundred Years War. It remained a prosperous community until the 16th Century and the wars of religion, when it again reverted to the position of the chief provincial town. After the town's surrender to the republicans in 1793 it was again partially destroyed but again rose to prosperity under the first empire. Steady urban and industrial expansion during the 20th Century has created the modern Lyon.

Such a long and varied history means that there is plenty for a visitor to Lyon to see. An

impression of the whole city can be obtained from the summit of Fourvière on the right bank of the Saône. Here also can be seen the Roman theatre, dating from the 1st or 2nd Centuries. Bordering the right bank of the Saône is the 'living museum' of Old Lyon, a compact mass of medieval and Renaissance buildings grouped round the cathedral of St John the Baptist, built between the 12th and 13th Centuries. Traces of the old medieval city can also be found on the peninsula, including the oldest church in Lyon, St Martin d'Ainay (1107). To the north is the hill of Croix Rousse where the silk weavers — the trade which gave Lyon much of its past prosperity — used to live. East of the Rhône are the newer districts of Lyon — the Part-Dieu district, with its modern office buildings, the university and the large park of La Tête d'Or which includes a lake, a zoo and botanical gardens. Further east are the suburbs of Villeurbanne and Montchat. To the south of the city are the industrial complexes of Pierre-Bénite, Irigny and Saint-Fons on either side of the Rhône.

Finally, mention must be made of the two road tunnels, the very long one under La Croix Rousse and the second under Fourvière.

(Photographs courtesy of the French Government Tourist Office.)



The river Rhône and one of the Lyon bridges.



Lyon Town Hall.

Farewell to IUPAC — another personal note

In the December 1984 issue (*CI*, 1984, No. 6, p. 55) I said farewell to Pergamon. Now it is time for me to say farewell to IUPAC. This I do with very mixed feelings. I really did want to devote more time to my garden and stamp collection (any offers?) when I retired, for the first time, in 1982 and I still do. However, it has been so interesting and pleasurable to work with you and for you that I cannot help feeling some considerable regret at leaving. I shall certainly miss my weekly visit to Oxford, where I was immediately made to feel welcome — I couldn't have wished for better colleagues with whom to work. I am only too willing to acknowledge that without their (and particularly Dr Williams') freely given ideas and help I would have found it impossible to keep *CI* going — in spite of the efforts of those who found the time to write

articles for publication, for which I was always very grateful.

I must say that it has been a fascinating 2½ years (it was originally going to be about 9 months!) as temporary, part-time Editor. Although I had had a few papers published, I had no idea of what went on behind the scenes in the publications world — particularly in production of a magazine such as *CI*. I have also, I think, made more use of my dictionaries recently than for the whole of my life previously; it is very humbling to find out how little you know of your own language. However, I still do not know what 'speciation' means, other than in the biological sense!

And so I leave you, ladies and gentlemen of IUPAC, almost exactly 10 years since I first left the Union, when my term as Secretary of Division V was complete. As on that previous occasion, I leave full of admiration for the high class of work done, and not least of the international agreement achieved, on a voluntary basis by the members of the various bodies of the Union.

R. W. Fennell

33rd GENERAL ASSEMBLY

Complete cumulative list of amendments to the timetable of meetings

Re-scheduling of Meetings

CHEMRAWN — cancel meetings on 30 August and re-schedule on *1 September*, 9–13 Room 35, 14–18 Room 9

Commission on Nomenclature of Inorganic Chemistry	24–29 August (11)	
Applied Chemistry Division Committee (Applied Chemistry Division Committee meeting originally scheduled for 14–18 on Tuesday, 3 September, is cancelled.)	Saturday 31 August	10–13 (32)

Commission on Biotechnology (VI.2) — cancel meetings on 3 September and re-schedule on *1 September*, 9–13, 14–18 Room 42

Commissions on Food Chemistry (VI.1) and Biotechnology (VI.2) — Joint meeting changed from 3 September to 2 September, 14–15 Room 33

Additional Meetings

Task Group Meeting (Commission I.1)	Thursday 29 August	14.30 (20)
	Friday 30 August	14.30 (20)
	Tuesday 3 September	9–13 14–18 (8)
	Wednesday 4 September	9–13 14–18 (8)
Commission on Pesticide Chemistry (VI.5) [to meet on one additional day]	Friday 30 August	9–13 14–18 (10)
Harmonization of Collaborative Analytical Studies — Representatives from Analytical, Applied and Clinical Chemistry Divisions	Sunday 1 September	9.30–13 14–16 (23)
Interdivisional Meeting <i>re</i> IUPAC Sponsored Symposia	Sunday 1 September	9–13 (41)
Commissions V.1 and V.3 (joint meeting)	Sunday 1 September	17–19* (2)
Commission on Water Chemistry (VI.6)	Monday 2 September	9–13 14–18 (27)
	Tuesday 3 September	9–13 14–18 (7)
<i>Ad hoc</i> meeting of Divisional Representatives on International Cooperation in Biotechnology	Tuesday 3 September	9–13 (4)

Changes of Meeting Rooms

Inorganic Chemistry Division Committee (II)	Friday 30 August	9-12 14-17 (13)
Commission on Thermodynamics (I.2)	Saturday 31 August	9-13 (11)
Subcommittee on Toxicology of Aluminium	Saturday 31 August	9-13 (21)
Subcommittee on Toxicology of Selenium	Saturday 31 August	9-13 (15)
Commission on Teaching (VII.3)	Sunday 1 September	14-16 (41)

CHANGE OF POSTAL ADDRESS AND REMINDER OF CHANGE OF TELEPHONE NUMBER:
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SCHEDULE OF 1985 MEETINGS OF IUPAC BODIES

Most IUPAC bodies will be meeting at the Union's General Assembly at Lyon, 30 August to 7 September 1985. Listed below are those scheduled to be held outside the General Assembly, as known at 15 February 1985.

IUPAC Body	Location	Date
Executive Committee	London (UK)	15-16 April
Finance Committee	Zürich (Switzerland)	18-19 February
IUB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN)	Utrecht (Netherlands)	20-22 May
Physical Chemistry Division (I)		
Task Group of Commission on Physicochemical Symbols, Terminology and Units (I.1)	Reading (UK)	4-7 March
Task Group of Commission on Physicochemical Symbols, Terminology and Units (I.1)	Lyon (France)	29-30 August 3-4 September }
Subcommittee on Catalyst Characterization	Uxbridge (UK)	28-29 March
Inorganic Chemistry Division (II)		
Commission on Nomenclature of Inorganic Chemistry (II.2)	London (UK)	10-12 April
Applied Chemistry Division (VI)		
Commission on Water Chemistry (VI.6)	London (UK)	9-10 March

IUPAC CONFERENCES

Additional information from address in parentheses

1985

Non-crystalline Solids

June 3–6. International Conference on the Theory of the Structures of Non-crystalline Solids. Bloomfield Hills, Michigan, USA.
(Dr Martin C. Steele, Director, Institute for Amorphous Studies, 1050 East Square Lake Road, Bloomfield Hills, Michigan 48013, USA.)

Surface and Colloid Science

June 24–28. 5th International Conference on Surface and Colloid Science. Potsdam, NY, USA.
(Prof E. Matijević, Institute of Colloid & Surface Science, Clarkson University, Potsdam, NY 13676, USA.)

Plasma Chemistry

July 1–5. 7th International Symposium on Plasma Chemistry. Eindhoven, Netherlands.
(Dr C. J. Timmermans, Department of Physics, Technische Hogeschool Eindhoven, PO Box 513, 5600 MB Eindhoven, Netherlands.)

Polymer Composites

July 8–11. 28th Microsymposium on Macromolecules: Polymer Composites. Prague, Czechoslovakia.
(PMM Secretariat, Institute of Macromolecular Chemistry, Czechoslovakia Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Organometallic Chemistry

July 12–15. 3rd International Symposium on Organometallic Chemistry directed toward Organic Synthesis. Kyoto, Japan.
(Prof R. Noyori, Department of Chemistry, Nagoya University (Rigaku-Bu), Nagoya, 464 Japan.)

Aromatic Compounds

July 15–19. 5th International Symposium on Novel Aromatic Compounds. St Andrews, UK.
(Dr P. J. Garratt, Department of Chemistry, University College London, 20 Gordon Street, London WC1H 0AJ, UK.)

Interactions in Solution

July 15–19. 7th International Symposium on Solute–Solute–Solvent Interactions. Reading, UK.
(Dr T. M. Hardman, Department of Chemistry, The University of Reading, Whiteknights, Reading, Berkshire, RG6 2AD, UK.)

Mycotoxins and Phycotoxins

July 22–25. 6th International Symposium on Mycotoxins and Phycotoxins. Pretoria, Republic of South Africa.
(Miss Jill Sawers, CSIR Symposium Secretariat S351, Council for Scientific and Industrial Research, POB 395, Pretoria 0001, Republic of South Africa.)

Heterocyclic Chemistry

August 11–16. 10th International Congress of Heterocyclic Chemistry. Waterloo, Ontario, Canada.
(Ms Margaret Gerth, Tenth ICHC, The Guelph–Waterloo Centre for Graduate Work in Chemistry, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.)

Hydrothermal Reactions

August 12–14. 2nd International Symposium on Hydrothermal Reactions. University Park, Pennsylvania, USA.
(Prof H. L. Barnes, Professor of Geochemistry and Director of Ore Deposits, College of Earth and Mineral Sciences, The Pennsylvania State University, 235 Deike Building, University Park, Pennsylvania 16802, USA.)

Cationic Polymerization

August 12–15. 7th International Symposium on Cationic Polymerization and Related Processes. Jena, German Democratic Republic.
(Dr R. H. Wondraczek, Sektion Chemie, Friedrich-Schiller-Universität, DDR-6900 Jena, German Democratic Republic.)

Macromolecules

August 18–23. 30th International Symposium on Macromolecules. The Hague, Netherlands.
(30th International Symposium on Macromolecules, c/o QLT Convention Services, Keizersgracht 792, 1017 EC Amsterdam, Netherlands.)

Thermal Analysis

August 19–23. 8th International Conference on Thermal Analysis. Bratislava, Czechoslovakia.
(Dr O. Korab, The Organizing Committee of the 8th ICTA, c/o Slovak Technical University, 812 43 Bratislava, Czechoslovakia.)

Chemical Education

August 23–28. 8th International Conference on Chemical Education: Widening the Scope of Chemistry. Tokyo, Japan.
(Prof J. T. Shimozawa, Secretary General of 8-ICCE, c/o The Chemical Society of Japan, 1–5 Kanda-Surugadai, Chiyoda-ku, Tokyo, 101 Japan.)

Mathematics and Chemistry

September 2–5. International Symposium on Applications of Mathematical Concepts to Chemistry. Dubrovnik, Croatia, Yugoslavia.
(Prof Lj. Rušćić, The Rugjer Bošković Institute, PO Box 1016, Bijenička 54, YU-41001 Zagreb, Croatia, Yugoslavia.)

Marine Natural Products

September 2–6. 5th International Symposium on Marine Natural Products. Paris, France.
(Dr A. Ahond, Institut de Chimie des Substances Naturelles, CNRS, F-91190 Gif sur Yvette, France.)

Vapour–Liquid Equilibria

September 5–7. 2nd International Workshop on Vapour–Liquid Equilibria in 1-Alkanol + *n*-Alkane Mixtures. Paris, France.
(Dr H. V. Kehiaian, Laboratoire de Chimie Organique Physique, Institut de Topologie et de Dynamique des Systèmes, Université Paris VII, 1 rue Guy de la Brosse, F-75005 Paris, France.)

Organometallic Chemistry

September 8–13. 12th International Conference on Organometallic Chemistry. Vienna, Austria.
(Prof K. Schlögl, Institut für Organische Chemie der Universität Wien, Währingerstrasse 38, A-1090 Wien, Austria.)

Mass Spectrometry

September 9–13. 10th International Mass Spectrometry Conference. Swansea, UK.
(Dr F. M. Harris, Royal Society Research Unit, University College of Swansea, Swansea SA2 8PP, UK.)

IUPAC Congress

September 9–13. 30th International Congress of Pure and Applied Chemistry. Manchester, UK.
(The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Spectroscopy

September 15–21. 24th Colloquium Spectroscopicum Internationale (CSI XXIV). Garmisch-Partenkirchen, Federal Republic of Germany.
(Dr J. Wendenburg, Gesellschaft Deutscher Chemiker, Carl Bosch-Haus, Postfach 900440, Varrentrappstrasse 40-42, D-6000 Frankfurt/Main 90, Federal Republic of Germany.)

Mössbauer Effect

September 16–20. International Conference on the Applications of the Mössbauer Effect. Leuven, Belgium.
(Prof R. Coussemment, Instituut voor Kern-en Stralingsfysica, Celestijnenlaan 200 D, B-3030 Leuven, Belgium.)

Chemical Resources of the Ocean

September 23–27. CHEMRAWN IV: The Global Ocean — Its Chemistry and Resources. Woods Hole, Massachusetts, USA.
(CHEMRAWN IV Coordinating Office, Oceanography Program, The University of Michigan, 2455 Hayward Avenue, Ann Arbor, Michigan 48109-2143, USA.)

Medicinal Natural Products

November 10–14. International Symposium on Organic Chemistry of Medicinal Natural Products. Shanghai, China.
(Prof Wang Yu, Chairman, Organizing Committee, International Symposium on Organic Chemistry of Medicinal Natural Products (IUPAC), 345 Lingling Lu, Shanghai 200032, China.)

1986

Ring-Opening Polymerization

June 22–26. 5th International Symposium on Ring-Opening Polymerization. Blois, France.
(Dr N. Spassky, Laboratoire de Chimie Macromoléculaire, Université Pierre et Marie Curie, Tour 44, 4 place Jussieu, F-75230 Paris Cédex 05, France.)

Synthetic Polymeric Membranes

July 7–10. 29th Microsymposium on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Crosslinked Epoxides

July 14–17. 9th Discussion Conference on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Analytical Chemistry

July 20–26. SAC 86: International Conference on Analytical Chemistry. Bristol, UK.
(The Secretary, Analytical Division, Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Pesticide Chemistry

August 10–17. 6th International Pesticide Chemistry Congress. Ottawa, Canada.
(The Chemical Institute of Canada, 151 Slater Street, Suite 906, Ottawa, Ontario, Canada K1P 5H3.)

Non-aqueous Solutions

August 17–21. 10th International Conference on Non-aqueous Solutions. Leuven, Belgium.
(Dr G. Maes, Department of Chemistry, University of Leuven, Celestijnenlaan 200F, B-3030 Heverlee, Belgium.)

Natural Products

August 17–23. 15th International Symposium on the Chemistry of Natural Products. The Hague, Netherlands.
(Dr G. J. Koomen, Secretary, 15th IUPAC International Symposium on the Chemistry of Natural Products, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, Netherlands.)

Physical Organic Chemistry

August 24–29. 8th IUPAC Conference on Physical Organic Chemistry, Tokyo, Japan.
(Prof M. Oki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

1987

CHEMRAWN VI

May 17–22. CHEMRAWN VI. World Conference on Advanced Materials Needed for Innovations — Energy, Transportation and Communications. Tokyo, Japan.
(Mr H. Hamada, Executive Director, The Chemical Society of Japan, 1–5 Kanda-Suragadai, Chiyoda-ku, Tokyo, Japan.)

REVISIONS TO IUPAC HANDBOOK

CI, 1984 Supplement

Additions and amendments to the *Handbook* between 6 February 1984 and 2 April 1985 are given below.

Additions, new entries, are marked with an asterisk. The affiliation of new members of IUPAC bodies is included.

Amendments are shown by # at the beginning of the line in which the revision occurs.

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- Mr. R. W. Fennell [p. v, Editor of Chemistry International; p. 11, Chemistry
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- Prof. N. A. Ghanem (deceased) [p. 24, NR IV.2]
- Dr. Clarisse Habraken (resigned) [p. 12, NR CTC]
- Dr. J. Hislop (resigned) [p. 30, AM V.7]
- Prof. G. N. Richards [p. 6, Secretary ICO] (replaced by Dr. K. C. B. Wilkie)

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Front cover: CHEMRAWN IV: A benthic (bottom) chamber is deployed from Research Vessel OCEANUS in Buzzards Bay, Massachusetts for chemical studies of PCBs and other toxic materials (*photo courtesy of Woods Hole Oceanographic Institution*).

IUPACRONYMS

Einstein wrote that 'the eternally incomprehensible thing about the world is its comprehensibility'. After one month as IUPAC's new affiliate affairs secretary (AAS), information officer, publicity officer, editor of *CI*, journalist, photographer, cartoonist and — there was something else but I've forgotten — I felt like adapting Einstein's statement to 'the eternally comprehensible thing about IUPAC is its incomprehensibility'. One of the reasons for this was — and still is to some extent — acronyms.

For instance, take this issue of *CI* (I mean *Chemistry International* of course). In the Secretary General's (SG's) column you will find acronyms such as UNESCO, ICSU and there are plenty of NAOs. The SG carefully explains unfamiliar acronyms such as ICMC and he even introduces a new one (at least new to me), namely CT. All this is perfectly understandable since we cannot expect him to write International Union of Paper, Acronyms and Confusion every time he means IUPAC (that's what he told me IUPAC stands for!).

After one month of such acronymonial confusion it occurred to me that one of my first tasks as AAS (etc.) should be to propose to IUPAC (somehow) that it set up a new commission (or committee?) to deal with the usage of acronyms, half-acronyms (such as CHEMRAWN) and part acronyms. An IUPACRONYM would be any acronym, half-acronym or part-acronym, which had been formally accepted by the proposed IUPAC Committee on Acronyms (ICA). It could then form part of IUPAC recommended terminology.

However it then occurred to me (belatedly as usual) that this might all be a waste of time since *CI* is an ideal vehicle for disseminating, interpreting and explaining IUPACRONYMS and their usage. As the new editor of *CI* I could unveil all the mysteries of IUPAC and reveal all to whoever might care to read the magazine.

But seriously . . .

. . . How do I, the new editor, see the aims and functions of *CI*? There are, I think, three overriding aims. First, *CI* should be informative. It should keep you up-to-date about IUPAC, its people, its activities, its associations and, of course, its recommendations and other publications. Second, the material in *CI* should be interesting and readable — if at all possible. This may be difficult with some of the more functional material such as summary minutes. However by good editing (and this will come — eventually) and the inclusion of photographs, humorous material and items of general interest we can do a lot to help. There are many other ways too and we will undoubtedly continue to need to rely on you — the reader — for your contributions. Third, I hope *CI* will become a forum for the expression of views on IUPAC and its activities. This will be particularly important when the new Affiliate Membership Scheme comes into operation next year.

Finally, after almost exactly two months in the editorial hot-seat, I am beginning to find that the incomprehensible is in fact very comprehensible — and indeed logical. My rapid and smooth initiation into IUPAC is largely due to the welcome, help and support I have received from colleagues in the IUPAC secretariat — Dr Mo. Williams, Miss Ann Troughton and Mr Dass Gujral — together with the secretarial assistants at the Secretariat. I am also grateful to the Secretary General, Prof. Tom West, for his advice and encouragement and to my predecessor, Mr Roger Fennell, for spending several days with me guiding me through the intricate twists and turns of editing *CI*.

IUPAC PEOPLE

Professor Guy Ourisson to succeed Professor Sir Derek Barton as Director at Gif



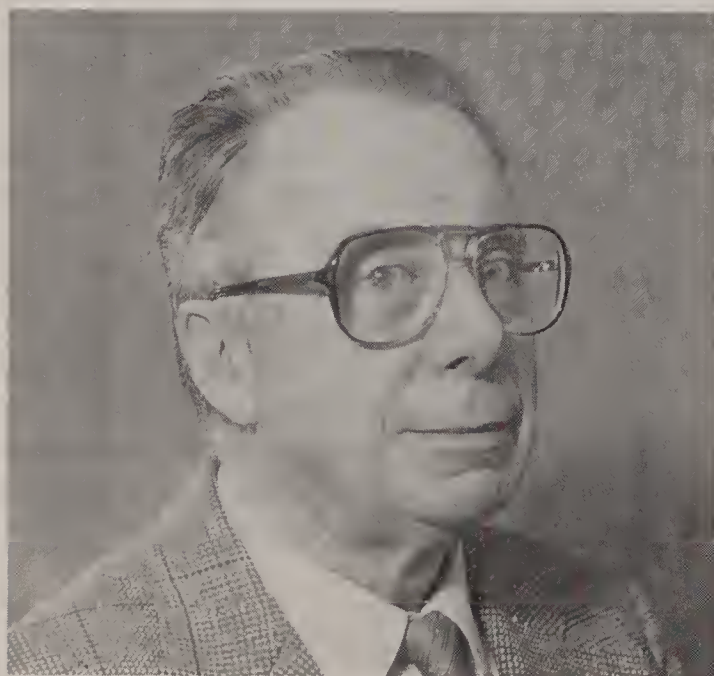
Prof. Guy Ourisson.

In October this year Prof. Guy Ourisson will be leaving the Centre de Neurochimie at Université Louis Pasteur in Strasbourg to become Director of the Institut de Chimie des Substances Naturelles of the Centre National de la Recherche Scientifique at Gif-sur-Yvette in France. However he will still maintain a small research group on membrane chemistry at Strasbourg. Guy Ourisson was Secretary General of IUPAC during 1975–83.

The man he replaces as Director at Gif is Prof. Sir Derek Barton. Sir Derek, who was President of the IUPAC Organic Chemistry Division during 1969–71, will be slowly winding down his research activities at Gif and transferring them to Texas A&M University where he will be a Research Professor from the end of 1986.



Prof. Sir Derek Barton.



Prof. R. N. Jones.

Dr R. N. Jones visits IUPAC Secretariat

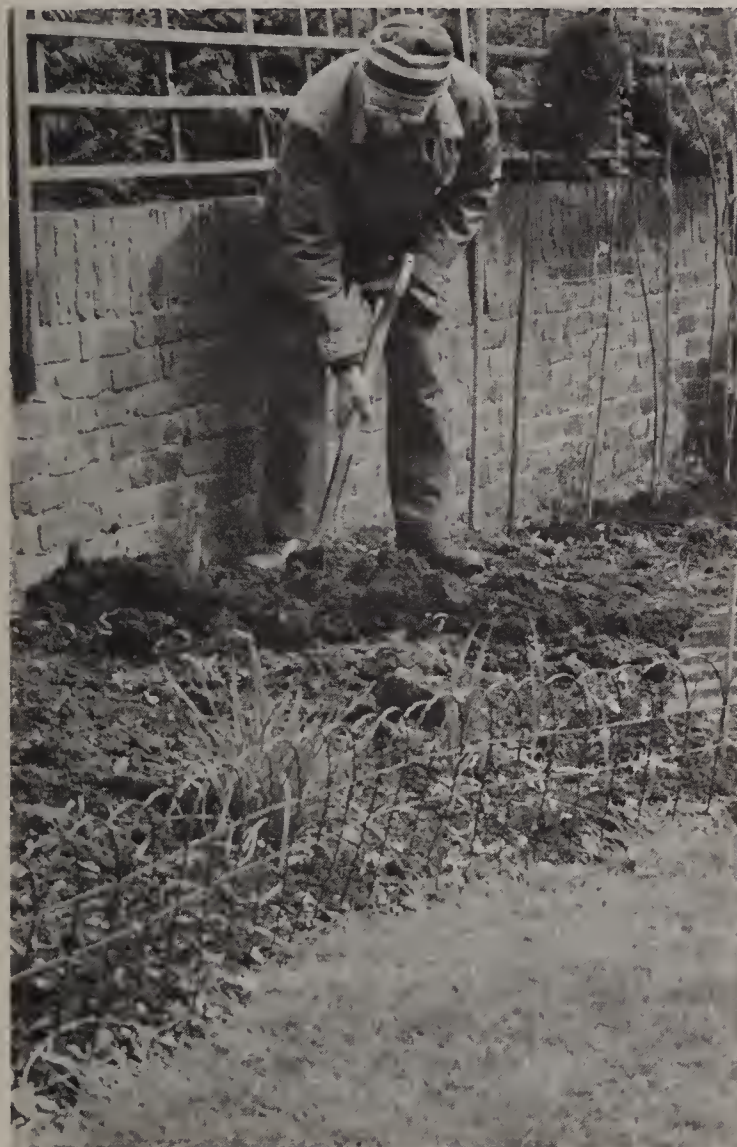
In May this year, Dr Norman Jones visited the IUPAC Secretariat in Oxford to discuss preparations for the General Assemblies in Lyon this year and Boston in 1987. Norman Jones was President of the Physical Chemistry Division from 1973 to 1977. He is currently a guest worker at the National Research Council (NRC) of Canada, from where he retired at the start of 1978. Subsequently he spent 3 years as Visiting Professor at Tokyo Institute of Technology. In October this year Dr Jones will be returning to Tokyo as a guest researcher for six months.

We regret to record the death of:

Prof. E. Wolfram, Hungary (17 April 1985) — Secretary, Commission on Colloid and Surface Chemistry including Catalysis (1975–85).

Prof. H. W. Nürnberg, FRG (12 May 1985) — Analytical Chemistry Division Committee (1977–81), Commission on Electroanalytical Chemistry (1967–77) and (1979–85).

CI Editor put out to grass



Mr Roger Fennell, previous editor of *CI*, ponders his retirement whilst digging his garden at home.

Letter to the Editor

The 12-year rule

Now that I have no official position in the Union I should like to comment on some items that came to my attention during my recent involvement with IUPAC.

I was intrigued when, at the General Assembly in Lyngby, the Bureau was taken to task over the application of '... the principle of fair geographical representation ...'. It was the Bureau that resisted the inclusion, in the rules of the Analytical Chemistry Division, of a geographical representation system for the membership of the Division V Committee that had been in practice for many years!

I am, and always have been, mystified at the apparent sensitivity of the Union to its description — by whom I have never been able to find out — as a 'charmed circle' ('exclusive club') which has, if I have interpreted the reports in *CI* correctly, led to the proposal to introduce the singularly superfluous '12-year rule' for Commission membership. In my opinion it will achieve very little in increasing turnover of membership, will inevitably lose the services of people valuable to IUPAC and place an extra bureaucratic burden on the Secretariat.

I was amazed, particularly in view of the sensitivity mentioned above, at the hesitancy of the Council at Lyngby in introducing the Affiliate Membership Scheme.

I hope that the 'new' standard state pressure will not cause as much confusion to practical applied chemists as the introduction of the 'new' mole did. At least this time an old recognized name is not being used for a new concept. By the way, I have never understood how half a calcium ion could be described as an entity!

Did you know that, in a sample survey of what people would like to see in *CI* carried out in 1983, over 90% wanted a correspondence column? Well, at least I do try.

R. W. Fennell

What's in a name?

Unnilquadium (Unq)

This is the IUPAC systematic name of the element with atomic number 104. The symbol for the element is Unq. The element was first reported in 1964 by Soviet scientists and called kurchatovium (Ku) after a Soviet nuclear physicist. The Americans produced the element in 1969 and called it rutherfordium (Rf) after Lord Rutherford. The IUPAC name unnilquadium is the wordcode for 104: un = 1; nil = 0; and

quad = 4. Similarly element 105 has the name unnilpentium (symbol Unp) and so on.

Not everyone is happy with this system of names for the 6d row of elements. Glenn T. Seaborg, Professor of Chemistry at the University of California and Nobel Prize winner claims (*C&EN*, May 15, 1985, p. 2) that the use of these names and symbols is 'unnecessarily cumbersome and serves no useful purpose. It is preferable simply to use the atomic number of the unnamed element and the atomic number in parenthesis in chemical formulas'.

The Regional Network for the Chemistry of Natural Products in Southeast Asia

In 1975 UNESCO established the Regional Network for the Chemistry of Natural Products in Southeast Asia. An international review panel has now evaluated the impact of the Network on the development of chemistry in Southeast Asia during the past 10 years and has recommended a strategy for the review.

Twenty-eight workshops have been held in 8 of the 10 countries involved in the Network and have provided training for research techniques for 1560 young scientists in Southeast Asia. Two major symposia, the 4th and 5th Asian Symposia on Medicinal Plants and Spices have been attended by more than 1000 participants on each occasion.

One of the major developments initiated by the Network is a comprehensive analytical service which provides spectra (ultraviolet, infrared, nuclear magnetic resonance, mass spectrometry) and other sophisticated data (for

example, X-ray crystallographic analyses) to research groups in the less-endowed institutions, absolutely free of charge. A collaborative research programme involving all the member countries has led to the publication of 71 papers in refereed journals during the period.

The Coordinating Board which manages the Network met eight times during the past ten years and helped to establish the Natural Products Research Institute of Seoul and the Chinese Medicinal Materials Research Centre in Hong Kong.

The review has shown that the Network has had a major impact on the development of chemistry in Southeast Asia and has made excellent use of the modest funding provided by UNESCO and the Government of Japan. This funding has allowed the Network to marshal major resources within and outside the region.

Atmospheric CO₂

The United Nations Environment Programme (UNEP), the World Meteorological Organization (WMO), and the International Council of Scientific Unions (ICSU) are undertaking a second joint assessment of the role of carbon dioxide in climate variations. (The first was in November 1980.) The second joint assessment meeting is planned for October 1985 in Villach, Austria, at the invitation of the Government of Austria. Participation is by invitation only. Participants will be limited to representatives of governments having major CO₂ climate research programmes, invited experts, those associated with the UNEP/WMO-sponsored CO₂-related research programmes, and organizations involved in the World Climate Programme.

The assessment will involve three working groups:

- the Carbon Cycle and future concentration of atmospheric CO₂;
- physical impacts of increasing atmospheric CO₂ and the detection of climate change;
- impacts on terrestrial and marine ecosystems.

New Canadian Company Associates

Three Canadian companies have agreed to become Company Associates of IUPAC. They are C-I-L Inc, Xerox Research Centre of Canada and Union Carbide Canada Ltd.

7th IUFOST Congress

The 7th International Congress of Food Science and Technology will be held in the Raffles City Convention Centre, Singapore, 28 September–2 October 1987. The programme is based on the theme 'Challenges in Food Science and Technology in the 90s'. Plenary lectures are expected in the following fields: Food production and post-harvest handling; Food preservation, processing and packaging, and automation; Food quality and standards, quality assurance, nutrition and consumerism; Biotechnology and microbiology; New foods and resources, and novel and synthetic foods; and Training and manpower requirements.

New President of IFCC

The International Federation of Clinical Chemistry — an Associated Organization of IUPAC — now has a new President. He is Dr Donald Young. Dr Young is currently Head of the Division of Laboratory Medicine in the Department of Pathology and Laboratory Medicine at the University of Pennsylvania in Philadelphia, USA. He took up office as President of IFCC on 1 January this year.

Atmospheric Chemistry Commission gets off the ground

The newly formed Atmospheric Chemistry Commission (VI.4) has held its first meeting. The Summary Minutes appear on p. 35.

SECRETARY GENERAL'S COLUMN

The primary purpose of the Secretary General's Column is to give readers of *CI* news of the meetings of the Officers, the Executive Committee, Bureau and Council. The Executive Committee is the only one of these bodies to have met recently, but because this issue of *CI* is the one that most IUPAC people will read before the General Assembly in Lyon I will, on this occasion, take the opportunity also to discuss some of the issues to be debated at Lyon — even though it means repetition of some things written in previous Columns.

The Executive Committee met at The Royal Society meeting rooms in London on 15–16 April. The Committee consists of the four Officers (President, Vice-President, Secretary General and Treasurer) plus the Past-President and three members elected by the Bureau. It is supported by the Executive- and Deputy Executive-Secretary and, on this occasion, the new Information Officer (editor of *CI*)/Affiliate Affairs Secretary, was invited as an observer. The Committee is responsible for the orderly discharge of the functions of the Union between meetings of the Bureau.

The Committee was principally concerned in April with preparation of the business to be discussed by the Bureau and Council at Lyon and with various aspects of the work of the Divisions and Commissions which will also meet at the General Assembly. Much of the discussion was of a technical or procedural nature, so I will concentrate only on a few topics which may be of more general interest.

Role of Medicinal Chemistry in IUPAC

Medicinal Chemistry has been the subject of much discussion within the Union in recent years. The subject was dealt with at Commission level within the Division of Organic Chemistry during 1975–81. The Division of Organic Chemistry forms the most obvious interface between chemistry and medicine, but following the first Vice-Presidential assessment of the work of all IUPAC bodies in 1981, the Commission was allowed to continue only on an *ad hoc* basis whilst a Division working party discussed future activity in this area. A working party activity was recommended for continuation at the General Assembly in 1983 and Council delegated its authority to the Bureau to re-establish the Commission, subject to receipt of suitable reports incorporating a definitive work programme. The International Committee of Medicinal Chemists (ICMC) has, however, made strong representations to IUPAC that the status of the subject within IUPAC should be at Division level. Elsewhere representations have been made that Medicinal Chemistry might have the status of an international union within ICSU. At the time of the Bureau meeting in Oxford in September 1984 it became clear that, whilst Division status for Medicinal Chemistry was not possible at present, alternative structures should be explored, including



The Royal Society, London, venue of the Executive Committee meeting.

an inter-union commission with, for example, the International Union of Biochemistry and the International Union of Pharmacology. Some Bureau members felt that Section status within IUPAC might be considered. The Bureau also concluded that whilst it could collaborate with ICMC, it would not be dictated to. The working party report to the Executive Committee in April 1985 made the point that everyone now favours an organization within IUPAC and again requested the Division/Section status that was requisite in the eyes of medicinal chemists. A schedule of subjects that could constitute the framework of a new work programme within IUPAC was received by the Executive Committee, but a conclusion was not reached pending a final report from the working party and the views of the Organic Chemistry Division at the General Assembly in Lyon. The Executive Committee noted, however, with some apprehension, that a considerable infrastructure of sub-committees might be necessary to support the outline programme. A point that the existence of one unique international organization for Medicinal Chemistry would facilitate fund-raising from the industry was also noted. At present the Executive Committee finds several difficulties with the nature of the preliminary draft of the programme and how it could fit into the existing structure of IUPAC but it



The President, Dr W. G. Schneider and The Foreign Secretary of The Royal Society, Sir Arnold Burgen, spare a moment for the photographer during their discussions of international matters relating to chemistry.

is keen, if possible, to retain a positive continuing activity in this area. It will be necessary soon to reach a definite conclusion, however, since the relevant discussions have been going on for four years. In this connection, I should perhaps add that ICSU is examining its role in relation to the Medical and Engineering Sciences, which are presently excluded from the ICSU family.

Biotechnology in IUPAC

The Executive Committee also discussed the outcome of the 1984 ICSU General Assembly's deliberations on biotechnology. There is an initiative within the ICSU bio-unions to set up either an ICSU special committee on biotechnology or an inter-union commission. I have in fact discussed this previously in *CI* No. 6, pp. 38–41 (1984). The Executive Committee strongly supported an IUPAC position paper on biotechnology sent to ICSU in January 1985, which was based on the recommendations of Prof. M. Ringpfeil (GDR), Vice-Chairman of the IUPAC VI.2 Commission on Biotechnology. The Executive Committee's view is that most biotechnology eventually ends up as a chemical operation.

Thus the future of biotechnology is inextricably bound up with that of chemistry and our Union must play a leading international role in it. To this end the Executive Committee has asked all Divisions of the Union to meet together at Lyon to state their interests in biotechnology and possible inputs and needs. Arising out of this meeting and the views of the Commission on Biotechnology, IUPAC intends to carry on with an active Commission of its own,

whatever ICSU may do, and to collaborate or even play a leading role, if requested, in an Inter-Union Commission on Biotechnology. It was the strongly expressed view of the Executive Committee that it would not wish to see a special committee of ICSU because Biotechnology is a vital component of Chemistry. It is therefore important that the future programme of the IUPAC Commission should be formulated carefully to the Union's advantage at Lyon.

Affiliate Affairs

In the Secretary General's Column in *CI* (No. 6, pp. 3–8, 1984) I wrote at length on the decision to launch the Affiliate Membership Scheme with effect from January 1986. The Union has written to all NAOs, inviting them to participate either directly or, where appropriate, through their national Chemical Societies and to invite their chemists to support IUPAC by becoming Affiliate Members. In addition, we now have a total of US-\$15 000 from ICSU and UNESCO to enrol Affiliates from developing countries at a nominal fee of US-\$1.0 each. Thus the Union hopes to spread news of its activities throughout the IUPAC member countries directly at individual chemist level and to subsidize a similar dissemination in member and non-member developing countries with the help of the ICSU/UNESCO funds.

The substance of the Affiliate Membership Scheme has been expressed several times in *CI*, for example, *CI*, No. 1, pp. 6–7 (1983) and No. 4, pp. 17–20 (1983), so I will not go over the discussion again except to say that the NAOs of the following

countries have already agreed to operate the Scheme, starting in 1986 — or, in the case of Canada, 1987 — through the membership organizations of their national Chemical Societies.

Argentina
Canada
Federal Republic of Germany
France
Japan
Sweden
United Kingdom
United States of America

Some other NAOs have responded that the subject will be decided at their forthcoming meetings when they will be discussing IUPAC affairs in general. Affiliates joining in 1986 through their NAOs or appointed Chemical Societies will pay an Affiliate Fee equivalent to US-\$7.50 plus a handling/distribution charge probably of a similar dimension — but which will vary from country to country. This will ensure regular receipt of six copies per year of *CI* with news of new IUPAC reports, nomenclature, events, symposia, specialist articles related to chemistry, activities of Commissions, Divisions and other IUPAC bodies, and a correspondence column. Affiliates' names will appear in an IUPAC register and Divisions and Commissions will be made aware of their interest. A concession (25%)

will be available to them on the purchase of all IUPAC publications appearing from 1986 onwards, except for *PAC* and they will be granted their own members' rate registration fees at future IUPAC-sponsored symposia and conferences. In addition to being able to correspond directly with Commissions and Divisions on scientific matters, Affiliates will be

The Union certainly hopes that chemists will support their International Union . . . and is particularly keen that younger chemists should thus be offered the opportunity to participate in IUPAC's activities and influence the way that chemistry's affairs are looked after in the world's international scientific community.

clearly visible as potential recruits to Commissions and other bodies of IUPAC. The Union certainly hopes that Chemists will support their International Union in this way and is particularly keen that younger chemists should thus be offered the opportunity to participate in IUPAC activities and influence the way that chemistry's affairs are looked after in the world international scientific community.



Elected Executive power amid the teacups. L to R: Prof. Y. Jeannin (France), Prof. C. Overberger (USA) and Prof. J. Michalski (Poland), elected members, with Prof. S. Nagakura (Japan), Past-President of IUPAC, at the Royal Society meeting rooms, April 1985.

Increased National Representation on IUPAC Bodies creates new problems at Secretariat

Whilst discussing the subject of increasing the participation of chemists in IUPAC, I should refer to the position of National Representatives on Commissions and Division Committees. These were introduced as a means of allowing increased international representation on, for example, Commissions with a total Titular and Associate membership of about 16. Any NAO that had no representation on an IUPAC body, that is, all Commissions and some Division Committees, was allowed to suggest the name of a National Representative for consideration by the Officers of the relevant IUPAC body. This has worked very well indeed to the extent that in 1984 there were 376 National Representatives, 294 Titular Members and 303 Associate and Co-opted Members on Union bodies. As I remarked in an earlier article, this represents an administrative load on the Secretariat equivalent to about 22 additional Commissions. In 1984 the Bureau noted a suggestion that there should be a charge of US-\$25.00–50.00 per National Representative to cover the administrative costs but, more particularly, to allow the Secretariat to recruit some assistance to deal with the volume of paper that is sent out to National Representatives. However, the Bureau felt that increased international representation was highly desirable and that the NAOs should initially be asked to propose only people who would be active and that Commissions should accept reappointment only of National Representatives known to be active. It was hoped that this might reduce the numbers sufficiently to control the nature of the problem. Preliminary indications for 1985 are that at Lyon there will be a large number of National Representatives once more. Whilst this is most welcome and shows a continuing and increasing interest in IUPAC and its activities, the administrative problem still seems to be of serious proportions. At Lyon, the Bureau may have to think of making a levy for those countries that can make a contribution, whilst others less able to do so could continue to participate free of charge up to a selected number of representatives. The sheer monitoring of the scheme is itself a burden, let alone finding out which National Representatives have been inactive and should therefore be monitored out of the system in future. The bureaucracy of introducing a screening mechanism of forms to be filled in for attendance (or participation by correspondence) of National Representatives by Commission Chairmen and NAOs and the exchange of correspondence over a period of several months with some 44 NAOs about the activity of about 400 individuals, makes the writer wonder if the suggested remedy may not be more time-consuming than the problem which it is supposed to alleviate. This will no doubt be debated again at Lyon!

History of IUPAC

IUPAC was founded in 1919, and despite the intervention of the second World War it has gone

from strength to strength. Needless to say, there are now none of the original founding fathers of IUPAC around and several generations of chemists have gone through the ranks and passed out of the Union. We hope that the Affiliate Membership Scheme will allow a continuing role and link for those who have served their time in the Union and will shortly have to leave. However, the beginnings of the Union are

IUPAC was founded in 1919, and . . . has gone from strength to strength.

now far enough distant in time to be considered historical and many of the incidents and even some of the personalities may tend to be forgotten — which is a great pity and a sad loss. The late Prof. S. Veibel of Denmark, for many years a most active member of IUPAC, particularly in the Analytical and Organic Chemistry Divisions, kept a carefully documented account of the Union for many years and a copy of his manuscript was passed to the Oxford Secretariat some time ago. Stimulated by Prof. A. Kjaer, Chairman of the Danish National Committee for Chemistry, its existence was discussed by the Executive Committee at London in April 1985 with a view to updating, editing and publication as a History of IUPAC — The First Fifty Years. The Committee feels that this would be of considerable interest to many people as well as a contribution to the future of the Union.

Critical Decisions to be taken at Lyon

At the 1983 General Assembly in Lyngby the Council accepted the adoption of a mathematical formula for calculation of national subscriptions to IUPAC in future years. This formula relates the subscription to the chemical turnover (CT) for each individual country and has the effect of smoothing out the sudden transitions that used to occur around the borderlines of different categories of membership. At the same time 'categories of membership' were automatically eliminated. The Bureau has now proposed the necessary changes to remove all reference to 'category of membership' from the Statutes and Bylaws and has reformulated the key admission (S3.3) and membership (S5.1) Statutes as follows:

S3.3 'A country requesting admission to the Union shall provide full information about its proposed Adhering Organization.'

S5.1 'The Council, to which the Bureau, Executive Committee, Standing Committees, Divisions, Sections, Commissions and all other bodies of the Union are responsible, is composed of the Delegations of the Adhering Organizations. Each Delegation shall be assigned a specific number of votes/Delegates (1–6) according to principles decided by the Council. Each Adhering Organization shall appoint its Delegates for every Council meeting.'

Changes to the Statutes and Bylaws can only be effected by the approval of two-thirds of the total

number of votes assigned to the Adhering Organizations. It is, therefore, important that all Delegations should be present and that they should vote on the changes to the Statutes and Bylaws at Lyon in September 1985.

The principles relating to the number of votes/delegates also have to be decided by the Council at Lyon. The proposals to be presented at Lyon have been discussed previously in the Secretary General's column (*CI*, No. 6, pp. 3–8, 1984), but since this is a critically important issue I will repeat the discussion. According to these principles:

- 1. No NAO will be assigned a smaller number of votes than at Lyngby, that is, *no NAO will lose votes as a result of the change.*
- 2. Any change (that is, increase) in the number of votes assigned to an NAO will be marginal compared to the number of votes at Lyngby, that is, *some NAOs will gain a vote as a result of the change.*
- 3. Whereas those NAOs with only one vote (that is, the lowest category according to the previous system) were unable to vote on non-scientific matters in the past they will now be able to vote on all matters, that is, *all NAOs will have the right to vote on policy matters as a result of the change.*

The Bureau proposes that the relationship between the number of votes and NAO subscriptions (derived from the formula) should be as follows:

Table 1. Proposed allocation of votes according to national subscriptions.

1984 NAO Subn. (US-\$ × 10 ³)	Votes
≥ 20	6
19.9–9.5	5
9.4–3.0	4
2.9–2.5	3
2.4–1.1	2
1.0–0.6	1

Taking the 1984 subscriptions calculated according to the formula accepted in 1983, Table 2 relates the votes that would have been allocated and compares them to that obtaining in Lyngby according to the previous system.

For the purpose of discussion, I have drawn lines across Table 2 to show the proposed new voting bands. According to the old system all NAOs in the proposed new 6-vote band had (or should have had) six votes at Lyngby, that is, no change should result for these NAOs. The NAOs in the proposed new 5-vote band all had (or should have had) 4 votes at Lyngby and would, therefore, benefit by 1 vote according to the new system. The NAOs in the proposed new 4-vote band all had (or should have had) 4 votes at Lyngby according to the old system and there should be no change for them. The NAOs in the proposed new 3-vote band all had 2 votes under the old system and would, therefore, benefit by one vote according to the new system. There

Table 2. Hypothetical allocation of votes in 1984 according to proposed allocation system, compared to allocation at Lyngby in 1983 according to old system.

NAO	1984 NAO Subn. (US-\$ × 10 ³)	Votes at Lyngby 1983	Hypothetical Votes 1984
USA	67.5	6	
Japan	38.3	6	
USSR	40.0	6	
FRG	28.9	6	
France	21.1	4	6
UK	20.0	6	
Italy	17.3	4	
GDR	16.4	4	
Spain	13.2	4	
Belgium	12.5	4	
Netherlands	11.5	4	5
Canada	10.0	4	
India	9.7	4	
South Africa	9.6	4	
Poland	9.5	2	
Australia	9.1	4	
Romania	8.6	4	
Switzerland	7.5	4	
Brazil	7.0	4	
Czechoslovakia	7.1	4	
China/Beijing	5.7	4	
China/Taipei	5.7	4	
Sweden	5.3	4	4
Hungary	5.0	2	
Argentina	4.5	4	
Austria	4.4	4	
Finland	4.0	4	
Bulgaria	3.9	2	
Norway	3.3	2	
Denmark	3.2	4	
Ireland	2.3	2	
Turkey	2.5	2	
Egypt	2.5	2	
Iraq	2.5	2	3
New Zealand	2.5	2	
Yugoslavia	2.5	2	
Portugal	1.5	2	
Greece	1.25	2	
Korean Republic	1.25	2	
Syria	1.25	2	2
Colombia	1.25	2	
Israel	1.1	2	
Cuba	0.6	1	
Venezuela	0.6	1	
Malaysia	0.6	1	1
Peru	0.6	(1)	

would be no change for the NAOs in the proposed new 2- and 1-vote bands, except that whereas NAOs with one vote were formerly unable to vote on policy matters they would be able to do so according to the new system.

The Bureau earnestly hopes that these proposals

Table 3. Proposed national subscriptions for 1986–87 based on biennial chemical turnover average and projected allocation of votes.

NAO	CT 1982–83 Biennial Average (US-\$ × 10 ⁹)	National Subscription (US-\$ × 10 ³)		Projected Votes 1987
		Proposed 1986–87	Actual 1985	
USA	181.0	74.8	71.9	6
Japan	77.4	42.0	40.2	
USSR	67.4	(40.0)	40.0	
FRG	49.1	30.8	29.0	
France	30.9	22.5	20.8	
UK	27.8	20.9	19.2	
Italy	22.4	18.1	16.7	5
GDR	20.9	17.2	16.0	
Spain	15.0	13.8	12.4	
Belgium	13.7	12.9	11.8	
Netherlands	12.8	12.4	11.7	
Canada	10.4	10.7	10.2	
India	—	10.2	9.6	
South Africa	—	10.2	9.5	
Poland	9.4	10.0	9.2	
Romania	8.1	9.1	8.4	4
Australia	7.8	8.8	8.1	
Switzerland	6.7	8.0	7.4	
Czechoslovakia	6.2	7.5	7.0	
Brazil	—	7.0	7.0	
China/Beijing	—	6.1	5.7	
China/Taipei	—	6.1	5.7	
Sweden	4.0	5.6	5.2	
Hungary	3.7	5.3	5.0	
Bulgaria	3.2	4.8	4.6	
Argentina	—	4.7	4.4	
Austria	3.0	4.6	4.2	
Finland	2.4	4.0	3.7	
Norway	2.0	3.5	3.3	
Denmark	1.9	3.4	3.2	
Egypt	—	2.7	2.5	3
New Zealand	—	2.7	2.5	
Yugoslavia	—	2.7	2.5	
Ireland	1.3	2.6	2.4	
Turkey	—	2.5	2.5	
Iraq	—	2.5	2.5	
Portugal	0.7	1.7	1.7	2
Greece	—	1.35	1.25	
Korean Republic	—	1.35	1.25	
Syria	—	1.35	1.25	
Israel	0.4	1.2	1.1	
Cuba	—	0.65	0.6	1
Venezuela	—	0.65	0.6	
Malaysia	—	0.65	0.6	
Peru	—	0.65	0.6	
		460 000	430 000	

will be accepted by the Council at Lyon.

In a further effort to smooth out sudden transitions in national subscriptions it was suggested at Lyngby that an average of CT figures should be used to calculate national subscriptions. The Executive Committee decided that the average CT figures for the biennium 1982–83 should be used and the Finance Committee has forecast the national subscriptions for 1986–87 on this basis. This is shown in Table 3 and again I have superimposed bands of votes for 1987 that would result according to the principles which Council is asked to approve at Lyon in 1985. It will be seen from a comparison of Tables 2 and 3 that no great changes are envisaged and NAOs should be able to see their way forward more clearly from a financial viewpoint.

Limitation of length of service on Commissions

Other changes to Statutes and Bylaws being submitted to the Council in Lyon, as requested in 1983 at Lyngby, relate to the limitation of length of service on Commissions and Division Committees. The purpose of these changes is to allow upward movement from Commissions through Division Committees and on to the Bureau and Executive Committee, but to place a limit on the total time that an individual can serve on one or more Commissions of the same Division or of more than one Division Committee. Within a given Commission it is proposed that the total length of service as Associate and Titular Member, including service as Chairman, Vice-Chairman or Secretary, shall not exceed 12 years *whether the periods of service are consecutive or not*. However, exceptional circumstances may allow for:

1. re-appointment of a Titular member who has served eight years,
2. the rotation of a person through alternate periods of Titular and Associate membership beyond a total of twelve years,
3. membership (in any capacity other than that of a National Representative) of more than one Commission of a Division or of different Divisions beyond a total of twelve years.

In each case the exceptional extension will be for a period of two years only.

Because these changes were approved in principle only at Lyngby, they were used as guidelines for 1983–85. If the Council approves the changes they will become operative from the end of the Assembly, that is, for 1985–87. At Lyon it will, however, be impossible for the Secretariat at such short notice to check the validity of proposals for extensions of service against these criteria. We will, therefore, have to rely on checking by the Commissions and Division Committees in the first instance. Appointments made at the meeting of the new Bureau at the end of the General Assembly will be subject to any violations of the 12-year limitation discovered subsequently by the Secretariat.

Academician N. M. Emanuel

The Executive Committee noted with great sadness the death of Academician Prof. N. M. Emanuel of the Soviet Union on 8th December 1984. Prof. Emanuel was well known in IUPAC and was liked and respected by all IUPAC people who had the privilege of working with him. He was a member of the Executive Committee and Bureau during 1971–79 and led the Soviet Delegation to the General Assembly on several occasions. He was also the



Academician Prof. N. M. Emanuel.

Chairman of the National Committee of Soviet Chemists and generally responsible for IUPAC affairs within the Soviet Union. His death is a great loss not only to chemistry as a whole, but to IUPAC in particular. Whilst it is not the custom to write obituaries in these pages and I do not seek to break this custom, nevertheless Prof. Emanuel was a very special person for IUPAC. The Union owed a great deal to him and I, for one, could not let his passing remain unmentioned in this Column. A photograph of Prof. Emanuel in his younger days is reproduced here with gratitude and respect.

The Royal Irish Academy

by Professor Dervilla M. X. Donnelly

In May this year The Royal Irish Academy celebrated its 200th anniversary. This article outlines the history of the Academy from its foundation to the present day.

The Academy, founded in May 1785 by members of the Dublin Society (now the Royal Dublin Society), was incorporated the following January under the royal patronage of George III as a society with the objective of 'promoting the study of science, polite literature and antiquities'. Its first president was Lord Charlemont. In 1799, Richard Kirwan, recognized as one of the foremost chemists in Europe,



Academy House, premises of the Royal Irish Society since 1852.

became the second holder of this office — a position he held until 1812. Other chemists to be so honoured were Sir Robert Kane (1877–82), Sydney Young (1921–26) and Vincent C. Barry (1970–73).

In 1852 the Academy moved to its present house, an 18th century building. The building was formerly the premises of the Reform Club and previously that of the Irish Metropolitan Conservation Society. The Academy Library is now housed in the Meeting and Reading Rooms which were added in 1854 to



Prof. Dervilla M. X. Donnelly, Chairman of the National Committee for Chemistry, Royal Irish Academy.

accommodate the Academy's Museum. The collection from this museum is now deposited in the National Museum of Ireland. It contains many of our National Treasures — the Ardagh Chalice, the Cross of Cong, the Tara Brooch — as well as a major number of prehistoric gold objects.

The Academy is governed by a President and Council of twenty-one members. The number of Academy members is approximately 250, equally divided between science and humanities. Four members are elected annually to each section.

The Library of the Academy contains a major collection of manuscripts in Irish or of ancient Irish origin and includes the 15th-century Book of Lecan and the Leabhar Breac, and the 11th-century Book of the Dun Cow. It is also the keeper of the 6th-century Latin manuscript the Cathach or Psalter of St Columba.

The Library is the repository of publications received in exchange from other learned bodies. It holds a complete series of the Royal Society of London from 1665, the Académie Royale des Sciences from 1666 and the Deutsche Akademie der Wissenschaft from 1820. A limited number of these exchange publications are distributed to other academic libraries and research institutions and thus the Academy contributes significantly to the pool of scientific material available in Ireland.

In its role as publisher, the Academy has an excellent record in the Sciences and Archaeology. The *Transactions* were first published in 1787 and 1836 saw the first issue of its *Proceedings* which continue to this day. Among the other publications are the *Atlas of Ireland*, *Excavations at Knowth*, *The English in Medieval Ireland* and, in honour of the bicentenary, a history has been written, *The Royal Irish Academy: A Bicentennial History 1784–1985*¹ (see p. 41).

In the fifties the Academy acceded to a request from Government to accept the responsibility of representing the country on a number of international bodies and thus were born the National Committees. Each National Committee (currently there are twenty-one) relates to a special field of study and adheres to the relevant international union. In addition to their international activities

they contribute to the planning of teaching and research in Ireland and organize national and international symposia and conferences. The National Committee for Chemistry was constituted in 1956. The first meeting organized in Ireland under the auspices of IUPAC took place in July 1963 and the proceedings of the symposium on 'The chemistry and biochemistry of fungi and yeasts' appeared in the official IUPAC journal.²

Among the EUCHEM conferences held under the auspices of the Council of Europe and organized by the National Committee were specialist meetings on such themes as inorganic reaction mechanisms, heterocyclic synthesis, oligo- and polysaccharides, transition metal complexes. In this the bicentenary year the National Committee for Chemistry hosted jointly with the Royal Society of Chemistry (Perkin Division) a symposium on 'The Synthesis of Natural Products'. This was held in Academy House on April 15th.

References

1. *The Royal Irish Academy: A Bicentennial History 1785–1985*. The Royal Irish Academy, 1985.
2. IUPAC symposium on 'The chemistry and biochemistry of fungi and yeasts', 1963. *Pure Appl. Chem.*, 524–705.



The Academy Library holds scientific journals dating back to 1665.



View of Lyon taken from the summit of The Fourvière Hill. The cathedral of St John the Baptist (see cover of *CI*, 1985, Vol. 7, No. 3) and the river Saône are in the foreground. The tall building on the left is an office block rising above the modern shopping centre of Part Dieu. The row of trees below this lie on the bank of the river Rhône (*photo courtesy of the Tourist Office, Lyon*).

LYON

Rendez-vous with chemistry!

Over 700 chemists from more than 30 countries will meet in Lyon in the summer in one of the largest meetings the IUPAC has ever held. The occasion is the 33rd IUPAC General Assembly (30 August to 7 September 1985). The purpose of these General Assemblies — which are held every two years — is to reassess goals, discuss progress and plan future activities.

Attendance at a General Assembly is strictly by invitation only. Only members of the IUPAC commissions and committees, national representatives and invited observers may attend. At any one time over 30 meetings may be taking place simultaneously. Although committees and commissions meet at other times the General Assembly provides

an ideal opportunity for them to get together and hold discussions on topics of common interest.

The climax of the General Assembly is reached towards its end when the Bureau and Council of IUPAC meet. The Bureau acts for the Union during intervals between meetings of the Council. The Council is composed of the delegates of the present-



Prof. Jacque Robin, 'Animateur' of the local organizing committee in Lyon.

ly 44 member countries (National Adhering Organizations of IUPAC). The Bureau and all the Committees, Divisions and Commissions of IUPAC are responsible to the Council. At the General Assembly, the Council elects new Officers of the Union. These are the President, the Vice-President, the Secretary General and the Treasurer.

Recent General Assemblies have been held in Denmark (1983), Belgium (1981), Switzerland (1979) and Poland (1977). In 1965 the 23rd IUPAC General Assembly was held in Paris.

33rd IUPAC COUNCIL MEETING

Lyon, France: 6–7 September 1985

AGENDA

1. Introductory Remarks and Finalization of Agenda.
2. Approval of Minutes of 32nd Council Meeting and Matters Arising.
3. Announcement of Nominations for Officers and Bureau Members.
4. Announcement of Time of Elections.
5. Statutory Report of President on State of Union.
6. Biennial Report of Treasurer and Accounts for 1983–4/Appointment of Auditors.
7. Report of Finance Committee.
8. Tentative Budgets for 1986 and 1987 and National Subscriptions for 1986 and 1987.
9. Applications for Membership of IUPAC.
10. Applications for Associated Organization Status and Review of Existing Associated Organizations.
11. Reports of Division Presidents.
12. Report of Publications Committee.
13. Report of CHEMRAWN Committee.
14. Report on Affiliate Membership Scheme.
15. Proposed Changes to Statutes and Bylaws.
16. Proposals Formally Received from National Adhering Organizations.
17. Adoption of Recommendations on Nomenclature and Symbols.
18. Continuation/Dissolution of Existing IUPAC Bodies and Proposals for New Bodies.
19. Ratification of Decisions taken by Bureau and Executive Committee since 32nd General Assembly.
20. Important Matters Discussed by Bureau at 33rd General Assembly not Covered by Items on Council Agenda.
21. Elections.
22. Ratification of Dates and Places of 34th General Assembly and 31st Congress.
23. Provisional Places of 35th General Assembly and 32nd Congress.
24. Any Other Business (discussion only).

Rendez-vous in Ecully

Lyon has three major universities and a number of 'Grandes Ecoles'. One of the latter — the Ecole Centrale de Lyon (ECL) — is one of the two sites

where IUPAC will be holding its 33rd General Assembly meetings. The ECL is a school of engineering located in Ecully about 8 km from the centre of Lyon. Most of the meetings however will be held in the Ecole Supérieure de Commerce de Lyon (the Lyon Graduate School of Business Administration or ESCL). The ESCL — also in Ecully — is one of three leading Business Schools in France.



The Ecole Supérieure de Commerce de Lyon. The Hotel Campanile is on the right.

Lyon: a major centre for industry, research — and wine!

In the previous issue of *CI* we looked at the history and some of the landmarks of Lyon. We now turn our attention to the research and industry in Lyon.

Lyon is the third largest city in France. It is a significant inland port with both canal and river connections with Marseille. Lyon is perhaps most famous for its silk weaving industry. The silk industry took root in Lyon in 1536. Today the textile industry consists mostly of spinning, weaving and dyeing of artificial fibres. Chemical and charcoal manufacturing, non-ferrous metals, food processing, automobiles, petrol and electro-nuclear industries are also leading industries in Lyon.

Lyon is the major industrial centre in the Rhône-Alps region. The Rhône-Alps is the second most

important region of chemistry in France. Lyon and Grenoble — another important industrial city in the region — account for some 14 per cent of all the chemistry production in France. For example, the region produces all the phenol in France and is the primary producer of silicones in Europe. The chemical industry employs some 42 000 people in the region.

Research

Lyon has well over 200 research laboratories in which more than 1700 researchers work. The Rhône-Alps region is second only to Paris in the field of general research and accounts for some 25

per cent of all research activity in France. The Centre National de la Recherche Scientifique (CNRS), Rhône-Poulenc, and many other public and industrial organizations have laboratories and centres in the region. They include the Laboratory of Ionic and Molecular Spectrometry, the French Institute of Petroleum (IFP), the Technical Centre

for Leather, the Centre for Paints and Varnishes and the Centre for Dyeing and Cleaning.

Wine

To the north of Lyon the Beaujolais spreads its vineyards over more than 54 000 acres of hillside. To the south of Lyon, other vineyards rise in tiers on the slopes that look out over the Rhône. They produce both white and red wines of high quality which may be drunk young or bottled for future consumption. The Côtes du Rhône become more full-bodied as one goes south.



The Ecole Centrale de Lyon.

What do RMgX and Lyon have in common?

The answer is François Auguste Victor Grignard (1871–1935). Grignard moved to Lyon in 1894 to work as an assistant to Prof. P. A. Barbier. In 1901 he published his first paper, with Barbier, on the reactions of organomagnesium compounds in anhydrous ether. Grignard won the Nobel Prize for

Chemistry in 1912 for his discovery of Grignard reagents — these have the general formula RMgX where X is a halogen. From 1919 Grignard was Professor of Chemistry in Lyon and later became Director of the Ecole de Chimie.

Grignard is only one of many famous scientists

who have been associated with Lyon. For example, the dye aniline red was discovered by Verguin in the Lyon region in 1859. Other famous names from the region include:

François Rabelais (1494–1553): Practised medicine at the Hotel Dieu in Lyon.

Claude Bernard (1813–1878): Author of numerous discoveries in the scientific field. He defined the fundamental principles for research in his famous 'Introduction to the study of Experimental Medicine'.

André-Marie Ampère (1755–1836): Physicist and inventor of the electric telegraph and electromagnet.

The Montgolfier Brothers (1740–1799): Inventors of the hot-air balloon and hydraulic ram.

The Lumière Brothers (1864–1954): Inventors and producers of the cinema (1895) and researchers into colour photography.

Lyon memorial to Joseph Marie Jacquard (1752–1834) who built the first successful loom for weaving patterned fabric. The loom, which used punched cards to produce a pattern was a forerunner of the computer. The Jacquard model played an important part in the development of the silk industry in Lyon (photo courtesy of the Tourist Office, Lyon).



French stamp commemorates Victor Grignard.

Nominations

At every General Assembly elections are held for Officers of the Union and Elected Members of the Bureau (where vacancies exist). The deadline for receiving nominations was 6 July. Unfortunately, this was too late to allow biographical details and photographs of those nominated to be included in this issue of *CI*. They will, however, be posted on a central display board in the Ecole Supérieure de Commerce de Lyon (ESCL) during the General Assembly.



Professor Rao becomes first Indian chemist to be President of IUPAC

For the first time in its history an Indian scientist becomes President of IUPAC. He is Prof. C. N. R. Rao. Prof. Rao is currently Director of the Indian Institute of Science, Bangalore, as well as Chairman of its Solid State and Structural Chemistry Unit and Materials Research Laboratory. Earlier he has been Head of the Department of Chemistry, Indian Institute of Technology, Kanpur (later Dean of Research) and Visiting Professor at Purdue University (USA), Oxford University (UK), Cambridge University (UK), and La Trobe University (Australia).



Prof. Rao, the new President of IUPAC.

Prof. Rao's research interests are in the fields of solid state chemistry, surface science, spectroscopy and molecular structure. For his contributions to these subjects Prof. Rao has been awarded numerous honours by scientific organizations in India as well as by several prominent countries. He is a Fellow of the Indian Academy of Sciences and The Indian National Science Academy, and of The Royal Society, UK; he is a Foreign Member of the Slovenian Academy of Sciences, Yugoslavia, and a Founding Member of the Afrasian Academy of Sciences. He took over as President of the Indian

National Science Academy in January 1985. Prof. Rao also received the highest national honour (Padma Vibhushana) in the recent Republic Day honours list in India. This was conferred on him by the President of India.

Prof. Rao will assume office as President at the end of the General Assembly after having served for two years as Vice-President (President-Elect) since his election at the General Assembly in Lyngby

'There are other countries that are much further back on the road to development and India can help their situation via collaboration and through the work of international agencies such as IUPAC. Scientists need to participate in various activities to feel part of the international community. International meetings are also very important from a professional point of view to exchange ideas and meet fellow scientists. This is much more important for scientists in a developing country than in the developed nations of the west.'

From an interview with Prof. C. N. R. Rao published in Chemistry in Britain, March 1985, p. 267.

(Denmark) in 1983. Prof. Rao has been associated with IUPAC since 1971. He was a member of the Committee on Teaching of Chemistry from 1971 to 1981 (Chairman 1974-81), has served on the Commission on Molecular Structure and Spectroscopy from 1971 to 1983 (Chairman 1981-83), and has been an elected member of the Bureau since 1977. He was IUPAC representative on the ICSU Committee on Teaching of Science (1977-79).

Since 1983 the President of IUPAC has been Dr W. G. Schneider from Canada. The most recent President from France was Prof. J. Bénard (1971-73).

CHEMRAWN — past, present and future

Soon after the publication of this issue of *C/CHEMRAWN* IV will be held in Woods Hole, USA. In this report we review the CHEMRAWN programme and turn the spotlight on some of the activities of the CHEMRAWN programme — past, present and future.

The CHEMRAWN programme

A suggestion was made at the 1973 IUPAC General Assembly in Munich that there should be new procedures in IUPAC whereby council members could aid in identifying and solving important problems of chemistry having a direct impact on world needs. The general idea was unanimously approved by the 43 nations involved, and a statement was adopted under the heading 'Chemical Research Applied to World Needs' (CHEMRAWN).

It was not the objective of IUPAC or of CHEMRAWN to undertake research on its own. Rather, CHEMRAWN was designed to reflect a set of intentions around which a variety of activities might be organized.

CHEMRAWN's *first intention* reflected the first

step in science: to identify human needs capable of satisfaction through chemistry with particular attention to needs of global or multinational size.

CHEMRAWN's *second intention* was to provide a non-political, international forum for the collection, discussion, advancement, and dissemination of chemical knowledge deemed useful for the improvement of Man and his environment.

The *third intention* was to provide an international, non-governmental source of information for the benefit of research institutions, national governments, and international agencies with respect to chemistry and world needs.

IUPAC's initial enterprise in the CHEMRAWN



Prof. Cyril Ponnampuruma presiding over the CHEMRAWN II workshop in Sri Lanka. From left: Dr Nickell, Dr Hopper (partially hidden), Dr Brady, Prof. Ponnampuruma, Dr Rossiter and Sir George Porter.

programme was to convene the first 'World Conference on Future Sources of Organic Raw Materials'. This international conference attempted to define and set in perspective those factors that will ultimately determine the sources of organic raw materials necessary to support world chemical industries at the end of the century. The various sessions not only dealt with the future life-blood of some major industries but inspired and stimulated vast and fertile new fields for those working in the more basic, exploratory areas.

Two further CHEMRAWN conferences have already been held, another is being held this year and two more are in advanced stages of planning.

The CHEMRAWN Conferences:

- CHEMRAWN I: Future Sources of Organic Raw Materials
Toronto, Canada, 1978
- CHEMRAWN II: Chemistry and World Food Supplies: The New Frontiers
Manila, Philippines, 1982
- CHEMRAWN III: Resources Material Conversion
The Hague, Netherlands, 1984
- CHEMRAWN IV: The Global Ocean, Its Chemistry and Resources
Woods Hole, USA, 1985
- CHEMRAWN V: Current and Future Contributions of Chemistry to Health
Heidelberg, FRG, 1986
- CHEMRAWN VI: Advanced Materials for Innovations in Energy, Transportation, and Communications
Tokyo, Japan, 1987

CHEMRAWN II workshop in Sri Lanka

In January this year a CHEMRAWN group briefed government officials and research scientists in Sri Lanka.

Following the CHEMRAWN II Conference: Chemistry and Food Supplies — The New Frontiers, the first of a series of workshops was held in Colombo, Sri Lanka, on 7–8 January this year. The aim of these workshops is to brief government officials and research scientists and promote action following CHEMRAWN II.

The briefing was particularly appropriate since the Government of Sri Lanka is currently involved in a major study of the role of Science and Technology in Development. Agriculture will be the backbone of the country's economy and the major forward thrust proposed will be predominantly in the agricultural programmes. In addition, the Mahaweli Scheme, to bring under irrigation another million acres of land, almost a fifth of the available cultivatable land of the country, has just been completed. A matter of paramount importance to the country is the plan to make best use of this land after the major investment.

A test case

The briefing group included Dr Bryant W. Rossiter (Chairman of CHEMRAWN II), Dr Nyle C. Brady, Dr David Hopper, Dr Luis Nickell and Sir George Porter. The workshop was organized by the Institute of Fundamental Studies (IFS) on the initiation of Professor Cyril Ponnampereuma, senior science adviser to the President of Sri

Lanka, Director of IFS and Chairman of the CHEMRAWN II Future Actions Committee.

In reviewing the workshop Dr Rossiter pointed out that the briefing session in Colombo was the first of its kind — a test case. CHEMRAWN hoped to build on its success by conducting similar briefings in cooperation with government officials and leading scientists and engineers in other countries. He thought it was gratifying that Sri Lanka had reached the point in its development strategy that such a briefing could be highly worthwhile. In fact, that impression was the primary reason leading the Committee to choose Sri Lanka for the first briefing session. This was amply demonstrated by such facts as the country's present self-sufficiency in rice, the coming availability of a million acres of land for agriculture based on completion of the Mahaweli Scheme, and the establishment of such organizations as the Institute of Fundamental Studies and the Arthur Clarke Center. Also boding well for the future are the country's high literacy rate, the scientific and engineering talent available, and the work of the National Science Policy Commission in examining various options for Sri Lanka's development.

Dr Rossiter went on to say that the two days of discussions with ministry secretaries, research institute directors, university leaders, and others were most frank and honest. It was abundantly clear that Sri Lanka's infrastructure for agricultural research, development, and production



Dr Hopper, World Bank Vice-President for South Asia speaking at the workshop.

is poised to take the next big steps forward since:

- agricultural development is recognized as the mainstay for the country's future, and
- there is a desire to use the best that modern science can offer and to establish research and development priorities.

The group did not discuss in detail the seventeen specific recommendations stemming from the CHEMRAWN II Conference itself. According to Dr Rossiter they spoke for themselves, and the understanding of them displayed by briefing participants from Sri Lanka indicated to the group that proper use will be made of them as research and development programmes are formulated in the coming months. There are two points that stood out and warranted special mention, however.

First, diversity in agricultural research and development can in many ways be a source of strength in any country. It can also be a source of debilitating weakness if it leads to costly duplication, lack of adequate coordination, and

undue competition for support. The discussion clearly showed the interest in Sri Lanka in improved coordination, and the group wished to note specifically that they viewed coordination, supported by budgetary control, as essential for fruitful progress in modern agriculture today.

Second, it was clear that Sri Lanka has many talented scientists and engineers now and the necessary educational system to increase the supply in coming years. It was also very clear, however, that the country's scientists and engineers must have not only appropriate personal financial support, but also must have available a work environment of facilities and equipment that they find conducive to outstanding work and also a social and cultural environment that they find attractive and satisfying. Severe lacks in either or both of these environments could lead to dissatisfactions that hamper progress in research and development. Dr Rossiter expressed his wish to convey those two specific points for careful consideration by the President and the other leaders responsible for Sri Lanka's future.

Impressions of CHEMRAWN III

Dr Marchessault, Secretary of the CHEMRAWN Committee, summarizes his impressions of CHEMRAWN III.

Six years separated the first and third CHEMRAWN conferences but, the changes in the world situation with respect to energy sources, process technologies and products were more like a generation apart. At CHEMRAWN I the chemical world was in a state of crisis; CHEMRAWN III saw a detached rationalized outlook with oil supplies assured many decades beyond 2000. The growing energy contributions from coal, gas and nuclear fuels are being fitted into a world picture which sees considerable delays in large-scale investment in alternative sources such as tar sands and biomass. The latter is looked upon preferentially for organic raw materials.

The alcohol revolution: methanol from natural gas and ethanol via biomass fermentation, is under way. Both products are examples of extremes in catalysis technology. The broad utilization of methanol as a chemical building block is now evident. The utilization of methane heralds a new kind of C_1 chemistry with major advances in petrochemical syntheses being enabled by highly effective catalysts and improved separation processes.

Continuous cost reduction is a way of life in the chemical process industries, with new techniques such as computer-aided process design leading the way. The oil-exporting countries are

attracting the main share of new commodity plants, while the industrialized countries focus on products serving special markets, from health and agricultural products to those meeting the needs of the electronics industry.

The bio-synthetic potential of microorganisms has opened a new dimension for civilization. The influence of developments, such as:

genetic engineering
protoplast fusion
the culture of plant and animal cells

on the costs of fine and speciality chemicals, will be increasingly felt in areas such as human peptides, hormones and blood factors. However, a true synthetic biology awaits the development of a complete bioprocess engineering technology.

Several examples of biotechnology developments were described at the CHEMRAWN III conference. These included ICI's single cell protein process. ICI also discussed their new biopolymer: poly(β -hydroxybutyrate), which is the first true thermoplastic from biotechnology. The impact of genetic engineering, however, is still to be felt.

Other impressions of CHEMRAWN III were published in CI, No. 5, pp. 29–31 (1984).

CHEMRAWN IV at Woods Hole

CHEMRAWN IV is entitled The Global Ocean, Its Chemistry & Resources. It is to be held at Woods Hole, Massachusetts, USA, 23–27 September 1985

The global ocean is an international resource. Changes to one part of the ocean environment are ultimately shared with other oceanic regions by water movement and mixing. This is one of the several reasons that The International Union of Pure and Applied Chemistry (IUPAC) is sponsoring this international gathering of scientists to consider and assess the chemistry of the sea — its waters, substrate, minerals, chemical systems, biota, and food resources.

The conference will review those oceanic chemical processes, cycles, and resources important to all Mankind from an international point of view. This will be done by focusing on the natural chemical processes of the oceans and then concentrating on the chemical re-

sources of the seas and the seabed, including food and biochemical resources and the technology and environmental effects involved in utilizing these resources.

Objectives

The objectives of this meeting are to:

- review state-of-the-art research to stress what is known and what remains to be learned about the chemical systems and resources of the oceans
- identify and assign priorities to directions for future global ocean studies

- assess environmental impacts of utilization of resources
- encourage international cooperation and scientific exchange with regard to marine resources and research
- provide information to those individuals and agencies responsible for formulating policies involving utilization of chemical resources of the ocean.

To achieve these objectives technical sessions will be held on each of the following topics:

Chemical cycles and reservoirs
 Nutrient cycles and biological productivity
 Recent advances in marine chemistry
 Manganese crusts and nodules
 Biological resources drugs, chemical feedstocks, food
 Polymetallic sulfides
 Environmental impacts of resource utilization
 Placers and phosphorites
 Analysis and technology
 Mineral resources of the Pacific
 Economics of marine resources

The official language of the conference will be English. The registration fee is US-\$250. This fee includes a copy of the Proceedings as well as attendance at the social events. A special regis-



A CTD (conductivity/temperature/depth) profiler with a rosette of Niskin water samplers is deployed from R/V OCEANUS during a Gulf Stream Rings study. At the base of the package is a 'six shooter' — six pumps that filter radon from the water (photo courtesy of Woods Hole Oceanographic Institution).



Aerial view of Woods Hole, Massachusetts (photo courtesy of Woods Hole Oceanographic Institution).

tration fee of US-\$125 is available to bona fide full-time students. This special fee does not include the conference banquet, but does provide for attendance at the reception and poster session mixers and for a copy of the Perspectives and Recommendations. Block housing reservations have been made at the Swope Center at the conference site and at nearby inns/motels.

This conference will produce two important documents. The first will contain a summary of the technical presentations written in layman's language. This will include suggestions for further research into areas where international collaboration is needed to improve the use of marine resources by Mankind. This volume will be the fourth in the CHEMRAWN series of Perspectives and Recommendations, and it will be distributed worldwide to key people responsible for establishing policies with regard to careful use of the resources of the oceans.

The second document will be made up of the written versions of the invited technical presentations. These papers, representing the

thoughts and knowledge of world leaders in their areas of marine expertise, will constitute a valuable compilation of up-to-date information about marine resources.

The village of Woods Hole is located 80 miles south of Boston on the southwestern corner of Cape Cod and is easily accessible by car, bus or air from Boston and Providence, Rhode Island. It is home to two private marine science laboratories — the Marine Biological Laboratory and the Woods Hole Oceanographic Institution — and two government research facilities — the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration and the Branch of Atlantic-Gulf of Mexico Geology, Office of Marine Geology, of the United States Geological Survey.

STOP PRESS: CHEMRAWN IV

Chemrawn IV has been postponed from September 1985 for six months. More details will be available in the next issue of *CI*.

CHEMRAWN V

CHEMRAWN V is entitled Current and Future Contributions of Chemistry to Health — The New Frontiers. It is to be held in Heidelberg, Federal Republic of Germany, 22–26 September 1986.

The suggested titles for the various conference sessions are as follows:

Progress in analytical chemistry: A stimulant for diagnosis and therapy

Development of clinical chemistry past, present, future

Progress in diabetes management by selftesting with dry chemistry analysis

Analytical methods for prevention of type I diabetes

Technological frontiers in immunodiagnostics

Diagnostic management of thyroid diseases

Therapeutic drug monitoring

Progress in virus diagnostic

Nucleic acid diagnostic

New tools which will give answers to old questions

New approach in diagnostic of infectious diseases

Antibacterial and antiviral chemotherapy

Clinical experience and future needs in classical chemotherapy

Structure–activity relationship

State of the art and gaps in antimycotic chemotherapy

New molecular-biological concepts for the treatment of microbiological infections

Recent trends and development in antiviral chemotherapy

Immunomodulators and their promise for the future

Parasitic infections

Available anthelmintics and future needs

Available antiprotozoal drugs and future needs

Future concepts for the treatment of parasitic diseases

Metabolic disorders — A challenge to industrial civilization

Mechanism of atherogenesis, possible implications to design therapy

Lipid metabolism and atherosclerosis: Possibilities of controlling risk factors by drugs or diet

Diabetes therapy, prospects of treating a spreading multifactorial disease

The insulin receptor, a rationale for the development of drugs

Cardiovascular diseases

Pharmacology and therapeutic potential of calcium antagonists
New approaches to calcium modulation based on receptor pharmacology
Cardiac insufficiency — Promising approaches for the treatment of a life-threatening disease
Drugs of the future for the treatment of cardiac insufficiency
Arterial and venous thrombosis — New approaches in drug therapy

Neuropsychiatric disorders

Senile dementia: Outlook for the future
Pathological and biochemical aspects of Alzheimer's disease
Parkinson's disease: Biological and pharmacological aspects
Antidepressants today and tomorrow

Cancer — Are we making progress in research and clinical treatment?

Chemotherapy of cancer, a classical concept?
Success in chemotherapy of cancer
DNA-tumour viruses and oncogenes
RNA-tumour viruses and oncogenes
Therapy of cancer with monoclonal antibodies

For further information contact:

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D-6000 Frankfurt/Main 90,
Federal Republic of Germany.

Looking ahead to CHEMRAWN VI

CHEMRAWN VI is a World Conference on Advanced Materials for Innovations in Energy, Transportation and Communications. It will be held in Tokyo, Japan, 17–22 May 1987.

The conference is co-sponsored by IUPAC, The Science Council of Japan and The Chemical Society of Japan. The objectives of the conference are:

1. To clarify the role and limitations of advanced materials in technological innovation.
2. To clarify the impact of technological innovation resulting from the use of advanced materials and to analyse their effects upon social and economic affairs in both developed and developing countries.
3. To clarify the role of chemistry and chemical technology in development of advanced materials.

The programme

CHEMRAWN VI will focus on three fields: energy, transportation and communications, with particular emphasis on the roles of advanced materials promoting innovation in these fields.

The first day will consist of plenary addresses on the impact of technological innovation on human society. They will also provide an overview of the roles of science, technology and materials needs in the relevant fields. In the following three days there will be three parallel sessions on energy, transportation and communications respectively. Each session will have

two or three general addresses and lectures on specific subjects as follows:

Energy Session:

Nuclear energy, fossil energy and power generation
Energy conversion and functional materials
Super-conductive and conductive materials
Membrane separation
Biomass energy

Transportation Session:

Aerospace and materials needs
Future image of surface transportation
Composite materials

Communication Session:

Semiconductor devices and related technologies
Recording, memory and storage of information
Optoelectronic materials and systems

In the final day issues common to the three fields will be discussed. These will include:

Overviews of the needs of high performance and functional materials
Overviews of industrial materials: high performance ceramics, metal alloys, composite materials, and organic polymers

Discussions will also be held on:

cooperative projects
evaluation, standardization, and data base of
materials
technology transfer issues

*CHEMRAWN VI Conference circular No. 1 is
now available (see Conference Calendar p. 48).*

CHEMRAWN publications

Resources of Organic Matter for the Future — Perspectives and Recommendations

This short book contains the plenary lectures from the CHEMRAWN I Conference. It also contains abstracts of some of the proceedings published in full in the following publication.

It is edited by L. E. St-Pierre and was published in 1979 by Multiscience Publications Limited, 1253 McGill College, Suite 175, Montréal, Québec, Canada H3B 2Y5. ISBN 0 919868 06 1.

Future Sources of Organic Materials — CHEMRAWN I

This book contains the proceedings of the World Conference on Future Sources of Organic Raw Materials. Contents include:

Planning for future resources
Advanced technologies for coal, wood and
related feedstocks
New directions in the production of renewable
resources
Conversion and utilization of renewable re-
sources
Planning for future resources
Future feedstocks from petroleum, oil, shale
and tar sands

It is edited by L. E. St-Pierre and G. R. Brown and was published in 1980 by Pergamon Press, Oxford, UK, and New York, USA. ISBN 0 08 033490 7.

Chemistry and World Food Supplies: The New Frontiers — CHEMRAWN II

This book contains the proceedings of CHEMRAWN II. The sessions include:

Soil and crop management for efficient use of
water and nutrients
Integrated approaches to pest management
The role of chemistry and biochemistry in
improving animal production systems

Contributions of chemistry and biochemistry
to developing new and improved food
sources

Chemistry and biochemistry in the processing
and storage of food

Chemistry in the assessment and control of
the food supply

The forward edge

It is edited by L. W. Shemilt and was published in 1983 by Pergamon Press, Oxford, UK. ISBN 0 08 029242 0.

Chemistry and World Food Supplies: The New Frontiers — CHEMRAWN II, Perspectives and Recommendations

This book contains the plenary lectures and recommendations from CHEMRAWN II. It is edited by Gordon Bixler and L. W. Shemilt and was published in 1983 by the International Rice Research Institute, PO Box 933, Manila, Philippines.

World Conference on Resource Material Conversion: (Bio-)Chemical Process Bridges to Meet Future Needs — CHEMRAWN III

This volume contains the Conference working papers in loose leaf form in a ring binder. Plenary sessions:

resources
world needs
chemical processes
special session

Parallel sessions:

resources
resource to base chemicals
base chemicals to end products
resubstitution
loss prevention, environment and safety

Published in 1985 by QLT Convention Services, Keizersgracht 792, 1017 EC Amsterdam, Netherlands.

SUMMARY MINUTES

Macromolecular Division

Committee: Prague, Czechoslovakia, 13 July 1984

Terms of reference

The terms of reference for the Division and for Commissions IV.1 and IV.2, established during the Committee meeting in Lyngby, were approved.

Meetings

The 30th IUPAC International Symposium on Macromolecules will be held in The Hague (Netherlands), August 1985, the 31st in Merseburg (GDR), June/July 1987 and 32nd in Kyoto (Japan), August 1988. The International Symposium on 'Ring Opening Polymerization' under IUPAC sponsorship was approved to take place in June 1986 in Blois (France). Provisional approval was granted for IUPAC sponsorship for the 30th Prague Macromolecular Microsymposium on 'Supported Organic Reagents and Catalysts'. Other proposals for IUPAC-supported symposia on macromolecules were considered but approval postponed till the Lyon meeting.

Divisional finances

The financial situation was discussed, particularly in view of new activities being initiated by Commission IV.2. It was pointed out that most of the experimental work of Commission IV.2 is being performed in industrial laboratories *without* direct financial support from IUPAC. Financial problems of that Commission, arising from an insufficient budget, might lead to a reduction of the industrial contributions to these activities.

Publications

The Committee discussed new proposals from the IUPAC Publications Committee to avoid too many contributions from the Division to *PAC*. The Committee decided not to accept these proposals. Concerning the situation of '*Chemistry International*', the Committee expressed some concern. On the one hand a regular comprehensive review of IUPAC activities is definitely needed. On the other hand inclusion in such a publication of other topics of less importance would have to be weighed against its public-relation effect. In case the latter is difficult to establish, a more modest information bulletin, with a considerable reduction of the costs involved, should perhaps again be envisaged.

Relations with other organizations

The Macromolecular Division Committee decided that at present no direct involvement of the Division in SCOPE (Scientific Committee On Problems of the Environment) projects is to be expected. It was established that sufficient contact exist between ISO (International Organization for Standardization) and Commission IV.2 via the industrial members of its working parties. Commission IV.1 will try to establish contacts with those ISO groups directly concerned with macromolecular nomenclature.

New activities and projects

Preparations for a new working party on 'Biocompatibility' within Commission IV.2 have reached a final stage. The Committee approved that Prof. Josefowitch (France) will start some initiating activities and submit a formal proposal for this working party to be discussed during the next Committee meeting. The Committee also considered the possibilities for another working party on 'Liquid Crystals' which are being investigated by Prof. Platé (USSR) and Dr Anderson (USA). The Committee decided to request a more detailed proposal with clear terms of reference for this new working party.

CHEMRAWN

The Committee received information concerning past and future activities of CHEMRAWN, and discussed the possible involvement of the Division in such activities — in particular in the 1987 CHEMRAWN meeting on 'Advanced Materials' planned in Japan.

Next meeting

The next meeting will be at the IUPAC General Assembly in Lyon, France, 30 August 1985.

M. Mandel

Commission VI.5 — Pesticide

Chemistry: Schlangenbad, FRG, 15–20 July 1984

A total of seven working projects were reviewed. The final draft of the project, entitled 'Critical Evaluation of Model Ecosystems' will be sent to members for comments with the aim of completing this project in 1985. Draft reports on the other six will be prepared for review at the next meeting. Two reports entitled 'Non-extractable pesticide residues

in soils and plants' (No. 17), and 'Improved cost-effective approaches to pesticide residue analysis' (No. 18), were published in *PAC*, in 1984. A third report entitled 'Microbial adaption to pesticides' was approved by the Commission and will be prepared for publication. Two new projects, 'Microbial conversion of pesticides' and 'Bioavailability' were initiated and draft reports will be prepared for 1985.

The organization and programme for the 6th International IUPAC Congress on Pesticide Chemistry, which will be held in Ottawa in 1986, were discussed. Over 10 000 copies of the first circular were distributed in May 1984, and response to date has been favourable. The meeting of the Commission will be held just prior to the Congress.

Other discussions ranged over a variety of topics, including the scope of the Commission's activities, proposed new members, changing the name of the Commission and the role of national representatives. It was decided to request that national representatives indicate their continuing interest in Commission activities.

R. Greenhalgh

Commission (III.3) — Photochemistry: Interlaken, Switzerland, 26–27 July 1984

Fluorescence Standards. Dr Eaton distributed the 4th draft of this document to the members of the Commission and asked for comments.

Contact with Commission III.2. Prof. Iwamura reported on contacts with Prof. V. Gold from the Commission on Physical Organic Chemistry (III.2) about the work that the Commission is performing in order to establish a coherent system of names of chemical reactions. It was decided to ask Prof. Gold and Prof. Modena that the Commission on Photochemistry be consulted about all those reactions pertaining to photochemistry.

Glossary of Terms Used in Photochemistry. An extended discussion on the Glossary was carried out. This was done on the basis of a draft prepared by Prof. Braslavsky which included the answers of more than 40 scientists around the world to a previous draft (February 1984). Several terms were modified. In particular, Prof. Michl reported on the consultation with 66 scientists about the meaning of the term 'biradical'. A new definition of this term was included. It was decided that Prof. Braslavsky should prepare and distribute to the members of the Commission a final version of the Glossary by December 1984, in order to finalize the discussion in Lyon in 1985.

Next meeting

The next meeting will be held in Lyon, France, on 1 September 1985.

S. E. Braslavsky

Commission IV.2 — Polymer Characterization and Properties:

Paris, France, 28–29 September 1984

Structure and properties of commercial polymers

Status of current projects of this working party are as follows:

A study of runaway creep in poly(styrene). This is now complete experimentally and publication is being prepared.

The application of fracture mechanics to the prediction of the ductile/brittle transition. Work has continued on Nylon 66 and HDPE. Some interpretational difficulties have arisen with K_{IC} . A draft publication would be prepared during 1984.

Impact toughness of poly(propylene). Fracture toughness parameters, K_{IC} and G_c have been determined for poly(propylene) homo- and co-polymers. A final report is being drafted for publication.

Elongational flow of polymer melts: (three projects). The study concerned with draw resonance is well advanced and parameters leading to a more stable spinline have been identified. The other studies of instability in poly(olefin) fibre and film forming are at an early stage. The effects of changing molecular parameters are being investigated.

Defects in the molecular structure of poly(vinyl chloride) and their relation to thermal stability. A number of reports from this study have been amalgamated by A. Guyot and submitted to *PAC* for publication.

New programmes under active consideration are:

- Viscoelasticity and concomitant morphology of polymer blends
- Intrinsic characteristics of continuous fibre thermoplastic composites
- Dynamic mechanical spectra of cross-linked systems

Status of current projects of the East-Asian Sub-Group are as follows:

Viscoelastic properties of rubber-modified polymeric materials at elevated temperature. This project is now complete and has been submitted to *PAC* for publication.

Structure and properties of linear low density poly(ethylene). This project will be finished shortly. It has involved coordination with the East European Sub-Group.

Four new programmes have been started:

- Long-term ageing effects on mechanical properties of commercial polymers
- Physico-chemical properties of commercially available carbon fibres

Structure and properties of high vinyl poly(butadiene) rubber and its blends

Structure and dielectric properties of vinylidene fluoride copolymers

The East-European Sub-Group is just starting to become active and a number of its members have cooperated in some of the main Commission IV.2 programmes.

Molecular characterization of commercial polymers

Current studies continue with work on three different linear low-density poly(ethylenes). One of the polymers has been fractionated in three different ways and the fractions studied by GPC, IR, DSC and NMR. One report has been published in *PAC*, Vol. 56, pp. 625–634 (1984) with the title *Molecular characterization of ethylene-propylene block copolymers*.

A short report from the Poly(electrolytes) Sub-Group was received confirming strong activity on a worldwide basis. Light scattering studies and other measurements are being performed by a number of laboratories on the same sulphonated poly(styrene)-salt system.

The work of the Rubber Sub-Group has been hindered by lack of a coordinator. It was suggested that Dr Malcolm Hall be approached concerning this.

The meeting still felt that this was an important area needing attention.

Supported polymer films

Progress on current projects is as follows:

Adhesion. A paper 'New insight into the process of adhesion measurements and the interactions of polymer substrate surfaces' has been submitted for publication. A further paper concerned with surface structure is being prepared.

Stability of Amino Resin Systems. Difficulties were experienced in analysing these complex systems. Reorganizations in some of the cooperating companies coupled with the technical problems has held back progress on this project.

Analysis of Emulsion Paints. Work is completed and the final draft is expected to be approved at the next meeting. New projects, relying largely on the cooperation of research institutes, are proposed as follows:

Characterization of cure of coatings in relation to performance properties

Use of indentation measurement for elucidating film properties

Thermal properties of polymers

The first project on 'Glass transition phenomena in atactic poly(styrene) by DTA or DSC' is being worked on in 16 laboratories.

The second project on the 'Crystallization and melting behaviour of linear low density poly(ethylene)' is now under way.

Kinetic parameters for free radical polymerization

In order to make significant progress with the methyl methacrylate (MMA) polymerization programme, it was decided to abandon the styrene work which was making little progress.

The MMA programme has made good progress and the first reports are now in the course of publication. The first report will be concerned with absolute shrinkage values and error assessment. The second report will discuss the rate and molecular weight data.

It is not expected that this work will resolve the discrepancies in the literature, but the likely origin of these discrepancies has been identified.

The present experimental programme will terminate in 1985. A recommendation will be made to start a programme on modelling polymerization reactions under a different chairman.

New working parties

The meeting discussed progress in setting up working parties on *Liquid Crystalline Polymers* and *Bio-engineering Polymers*.

New publications

'Viscoelastic Properties of Rubber Modified Polymeric Materials at Elevated Temperatures'. Submitted to *PAC*.

'Molecular Characterization of Ethylene-Propylene Block Copolymers'. *PAC*, May 1984.

Next meeting

This is scheduled for the General Assembly, Lyon, 1–3 September 1985.

Commission VII.3 — Teaching (Clinical Chemistry Division): Barcelona, Spain, 15–18 October 1984

A paper entitled 'Teaching of Clinical Chemistry in the Medical Curriculum' (project 12/83) has been re-drafted and circulated for comment to the members of the Commission and a number of other persons. It will be ready for submission for consideration for publication after a number of relatively minor comments have been taken into account. 'A Basic Education and Training Framework for Medical Laboratory Technicians in Clinical Chemistry' (project 6/81) has been sub-

mitted and accepted for publication both on behalf of IUPAC and the International Federation of Clinical Chemistry (IFCC). Publication on behalf of the latter body has already taken place (*J. Clin. Chem. Biochem.*, Vol. 22, pp. 497–501 (1984).^{*} 'Certification, Licensure and Accreditation' (project 7/81) was approved by the Commission and should be submitted for consideration for publication on behalf of both IUPAC and IFCC. The preparation of the reference catalogue of Audio Visual and Bibliographic Material for Teaching in Clinical Chemistry (project 9/81) continues to be amassed. Much of this material has been collected from commercial sources where the response to the accumulation of strictly scientific material in a central point, such as the archives of the Teaching Commission, has been variable. The possibility of disseminating this material on request through the services of IFCC Secretariat should be explored. The Commission has produced a draft manuscript on drug effects in clinical chemistry (project 13/83) jointly with the IFCC Expert Panel on Drug Effects in Clinical Chemistry. Although approved in principle, there are one or two points which the Panel and Commission need to discuss further before a final draft can be submitted for consideration for publication. 'Teaching Guidelines for Clinical Chemistry for Effective Communication of Laboratory Data' (project 11/83) had been circulated for comment prior to the meeting and should now be submitted for consideration for publication on behalf of both IUPAC and IFCC, subject to one or two alterations.

Although not strictly a project of the Commission, a review of Visual Aids in Teaching was published in *CI*, No. 2, pp. 24–31 (1984), in association with the members of the Commission.

In addition, the Commission is directly concerned with a number of IFCC projects. It continues to administer the IFCC Visiting Lectureship programme and it is hoped to arrange visits to South Africa, Egypt, Colombia and Venezuela during 1985/6. The Commission is responsible for setting up an International Peer Review Body which will consist of a number of eminent Clinical Chemists who will be able and willing to comment on scientific documents received by IFCC prior to their acceptance by that body as approved documents. Finally, the Commission is directly concerned through IFCC with a major teaching programme, the IFCC Mexico Clinical Chemistry Project, which is a long-term training programme intended to help to improve the standard of clinical chemistry practice in Mexico and will be sponsored by a number of bodies including WHO through the Pan American Health Organization, The British Council and IFCC.

H. G. J. Worth

^{*}This paper has now been published on behalf of IUPAC in *PAC*, Vol. 56, pp. 2505–10 (1984).

Applied Chemistry Division Committee (VI): Washington DC, USA, 22–24 October 1984

Report of the Division President

The President made reference to his report presented to the Bureau (26 July 1984) and to the loose leaf format booklet containing Division and Commission terms of reference, membership and projects. He reported that it was intended to be used within and outside the Union with the aim of supplying information on the activities of the Division and that it would be updated on a regular basis, based on input from Commissions.

The proposed Affiliate Membership Scheme was discussed without reaching any firm conclusions. The President reported that the Division was taking an active part in the International Symposium on the Harmonization of Collaborative Analytical Studies, which was to be held 25–27 October 1984.

Reports from Commissions

The President reported that individuals from 'non-IUPAC countries' should, if necessary, only participate in Working Groups attached to a Commission. Institutions or laboratories in such countries should, however, not be coopted for collaboration with a Commission, for example, in collaborative studies.

Commissions should also have a close look at the activities of their National Representatives in a Commission context. Representatives who remain inactive should be asked to discontinue their membership.

The President reported that 'highlights' from Commissions' activities deserving a broader interest, should be brought to the attention of *CI*. The purpose of this request is to make the activities of our Commissions better known to the chemical public.

It was proposed that consideration to be given to changing the name of the Commission to 'Pesticide Science', although this may need approval from the Bureau.

'Suspended' Commissions

Proposed Atmospheric Chemistry Commission Report. There are three broad areas to be covered by the new IUPAC Commission on Atmospheric Chemistry:

- (a) Tropospheric chemistry.
- (b) Ambient atmospheres, that is, the area immediately affected by atmospheric discharges.
- (c) Workplace environment.

In all three areas, our Commission experts should review the current sampling and analysis programmes for atmospheric chemistry throughout the existing literature and in close collaboration with outside experts. Need should be recognized for new



Some members of the Applied Chemistry Division Committee at the National Academy of Sciences, Washington.

chemical methods to determine air contaminants.

It is hoped that this type of IUPAC work will contribute to more effective harmonization of air testing methods, permitting the reliable comparison of data obtained throughout the world.

The work of the Commission is also directed at technical personnel in those countries which are becoming concerned about air pollution aspects of an increasingly developing industrial economy. However, the guidance provided by our Commission is also useful to those countries that are already carrying out air analysis. The Commission does not intend to develop completely new analytical methods. Rather, its work will be directed towards judging existing methods, including their chemistry, and to publish results of critical appraisals, giving, in addition, technical information especially on the influence of sampling procedures on the chemical stability of the sampled substances (for example, artefacts).

Each appraisal should be combined with a cost/benefit analysis of the assessed chemical methods based on the following aspects:

- substance to be measured
- range of concentration
- necessity to measure the momentary concentration

- necessity to conduct long-term tests

- measuring error

- influence of interferents

- specific requirement properties for measuring method

- how to handle the measuring system

- weight

- dimensions

- time for assembling the system

- maintenance of the system

- influence of ambient conditions (temperature, air pressure, humidity, vibration, radiation, corrosion, explosion-proof)

- energy to operate the equipment

- cost of the measuring programme

- purchasing cost

- personnel cost

- cost of maintenance

- cost of repair

The programme of the Commission should relate to the whole field of scientific and technical activities in the field of atmospheric chemistry. The breadth of the area of activity to be selected means that procedures of selection will need to be used in order to avoid any dissipation of resources and to concentrate efforts on the topics most capable of

generating stimulating results.

Additional Members. Further experts for associate membership will be named after consultation with the titular members. It is also planned to invite at least five national representatives and several company associates to the future Commission meetings.

Handling the Projects. Each future titular member (including Chairman and Secretary) will be placed in charge of one project and will be supported by associate members and observers. The Commission, therefore, will have for each project one convenor and at least one additional expert.

The member in charge of a project (convenor) will circulate the compiled draft of the standard not later than six months after the first Commission meeting. Approximately twelve months after this first Commission meeting (that means Commission members have six months to comment on the draft through correspondence) a second meeting will be held, at which the second draft of the standard will be discussed, finalized and approved by the Commission. This version of the draft standard will then be sent within three months to outside experts and submissions of comments will be invited within four months. After receipt of comments and the making of relevant changes, the Commission will provide the respective IUPAC bodies with the final version of the standard.

Proposed Water Chemistry Commission report. If established, the Commission could first meet officially in Lyon in 1985. Although it had been suggested that two or three of the (potential) members get together in advance, forming a drafting (or planning) group preparing next year's Commission meeting.

Suggestions for projects included the following:

Study of groundwater pollution, for example, by chlorinated solvents, by pesticides.

Identification and elimination of 'persistent' organic waste water contaminants adversely affecting the preparation of drinking water.

Taste and odour control of potable waters.

Sewage treatment for irrigation.

Biological treatment of reservoirs.

Prevention and control of discolouration in distributed water supplies.

Eutrophication/algology — ageing of impoundment reservoirs, change of algal state, production of algal toxins.

Nitrate control — minimizing fertilizer application study of nitrogen pathways into water supplies, novel treatment removal techniques.

Evaluation and development of group parameters for the determination of contaminants in waste waters.

Possibilities for and limitations of the removal of heavy metals from waste waters.

Environmentally safe disposal of sludges.

Chemical and geochemical reactions in the unsaturated and saturated zones.

Definition of terms in applied hydrology (for example, for the various physical-chemical treatments, in obtaining drinking water and for waste water).

Derivation of scientifically based environmental quality objectives.

Derivation of simple procedures for toxicological assessment.

Analytical harmonization procedures.

Beyond such more specific topics, it is felt that efforts towards integration and coordination of the different approaches worldwide, for example, to waste water design and operation, are highly desirable and the activity of the Commission should also include the initiation and scientific organization of Workshops, Symposia, etc.

Evaluation of commission projects

The Committee discussed a critical assessment of IUPAC programmes by Dr G. Jäger in a letter to Prof. C. N. R. Rao. The following is an abstract concerning the Division.

'Recently I received a very informative brochure on the current programme of the Applied Chemistry Division issued by Dr Frehse, President of Division VI. This brochure (loose-leaf folder) contains brief descriptions of the various projects (titled, coordinator, objectives, present status, completion or review date) which are in progress in the Division. In addition you can find in it some other information, like the composition of Commissions, etc. In my opinion, such a compilation of activities is very useful, especially for someone outside the Division like myself. Therefore, I would like to suggest that all the other Divisions should try to compile their current activities in the same or similar way.'

With respect to the projects of Division VI, I received first comments from a colleague a few days ago. He wrote to me:

'My first reaction to the summary of projects was that virtually all of them dealt with problems of chemical analysis that could not readily be distinguished from those one might expect to find on the agenda of an analytical sub-committee or commission. Furthermore, the objectives of the Applied Chemistry Division, as stated in the booklet, underscored the emphasis that is being placed, almost as a matter of Divisional policy, on the effects of chemicals in the environment in the broadest sense of the term. To this end, the fields of interest appear to have been restricted to food chemistry, agricultural chemistry, some aspects of biotechnology, atmospheric and water chemistry, the last two reflecting the discussions held in London in October 1982, and reported upon to the Executive Committee following the suspension of Commissions VI.4, VI.6 and VI.7.

I have since noted that the Critical Assessment made by Dr. Schneider in May last year expressed what I take to be continuing disquiet at such a constrained programme: the summary of projects provided last December does not suggest any shift in emphasis since that assessment took place.

Clearly, a principle function of IUPAC Divisions must be the compilation of data and the provision of methods and standards of the highest authority and

hence of the widest possible acceptance; no doubt the Applied Chemistry Division project portfolio complies with certain aspects of this requirement.

It is also right and proper that the Division should take cognisance of societal pressures and their origins and undertake work that could result in objective and permanent reassurances being provided for the public and its legislators in the proper course of time. Industry itself is only too aware of the consequences of the alarm and concern that this rapid expansion during the last forty years has created in the minds of very many people in all walks of life.

Dr. Schneider refers to the ambiguity of meaning contained within the terms 'Applied Chemistry' and explains thereby some of the problems that he then felt beset the Division. I suggest that such problems arise, not from any ambiguity in title, but from the tendency to study and discuss, more fully and comprehensively, the consequences of the current and past application of chemistry, rather than the novel effects, processes and products, that the skilful application of the disciplines of chemistry does indubitably bring about.

It seems to me that, for example, a Committee such as CHEMRAWN draws attention to the need to look outwards and forwards; what I have seen so far of the Applied Chemistry Division work confirms my worry that an increasing proportion of what passes for sound academic work is, in fact, looking inwards and backwards; even whilst also claiming to be primarily concerned with 'Man's Needs'. This may well be a large conclusion to draw from such slender evidence, but I sense that most of those with chemical industry experience over the last thirty years would be found to be converging towards a view of this sort.

An abstract of the reply of the President (H. Frehse) is as follows:

'It is correct that many projects are of an analytical nature, particularly in Commissions VI.1 and VI.3; these analytical activities are focused on very special (oil, fats) or relatively special (food) matrices. I do not think that VI.3 will need to deviate from its conventional approach. VI.1 is at present restructuring itself and will be handling new projects with new horizons.

VI.2 (Biotechnology) is under discussion, concerning its efficiency as well as future activities in a broader (international) context.

VI.5 (Pesticide Chemistry) has already taken up new activities, beyond analytical aspects, for example, in Projects 8.2/81, 16/83, 17/83, 19/83, 20/83 (all of them as revised in July, 1984). Whilst these projects indeed deal with "consequences of current and past applications of chemistry", there is a clear need for an objective, scientific description and interpretation of such consequences. It would be unwise, I think, if we lost sight of presently prevailing problems due to looking ahead only, the more so since the animosity against chemistry within the general public concerns their presence even more than the future.

Water Chemistry and Atmospheric Chemistry were suspended three years ago, and the Division

is, at present, re-establishing two new Commissions to take care of these areas. It is our firm intention that these Commissions will consider problems of today in a future-orientated manner.'

Commissions should see to it that there is continuity in their projects. A project appearing in the project listing should appear as a publication later on (or officially abandoned) but not simply 'disappear' from the records!

Publications

The following publications have been made since the 32nd IUPAC General Assembly, Lyngby, August, 1983:

Recommended Method for the Gas Chromatographic Profile Analysis of Basic N-Containing Aromatic Components (Azaarenes) in High Protein Foods. (Commission on Food Chemistry, *PAC*, Vol. 55, pp. 2067–2071, 1983).

Results of a Collaborative Study on Determination of Erucic Acid. (Commission on Oils, Fats, and Derivatives, *PAC*, Vol. 56, pp. 301–304, 1984).

Non-Extractable Pesticide Residues in Soils and Plants. (Commission on Pesticide Chemistry, *PAC*, Vol. 56, pp. 945–946, 1984).

Improved Cost-Effective Approaches to Pesticide Residues Analysis. (Commission on Pesticide Chemistry, *PAC*, Vol. 56, pp. 1131–1152, 1984).

Microbial Adaptation to Pesticides. (Commission on Pesticide Chemistry, *PAC*, Vol. 57, pp. 389–403, 1985).

Relations with other organizations

It was reported that the International Organization for Standardization (ISO) were continuing to submit draft international standards for distribution by the Secretary to the appropriate commissions for comment. The committee were informed of the wide distribution of the project booklet to many international organizations.

Next meeting

The next meeting will be held in Lyon on 30 August 1985.

L. E. Coles

Commission I.3 — Electrochemistry: Lausanne, Switzerland, 9 November 1984

The discussion concentrated on finalizing the document 'Corrosion Nomenclature', prepared by K. E. Heusler, which was circulated, but not discussed at Lyngby. The aspects more carefully examined were (i) the relationship between the IUPAC document and those provided by other bodies (ISO, DIN,

etc.), (ii) the field to be covered specifically, and (iii) the way the treatment should be performed.

The results of the discussion can be summarized as follows:

- (a) Other bodies generally provide a glossary of corrosion terms. IUPAC should provide definitions on a more physical basis. Only terms and concepts which can be illustrated more completely or more rigorously should be included in our document thus avoiding useless plain repetitions;
- (b) After a short section of more general validity, only *electrochemical corrosion* issues should be dealt with. This has been made clear in the revised title (Electrochemical Corrosion Nomenclature);
- (c) Since corrosion has a dramatic impact on engineering and technology, the usage of a number of terms and concepts, even if not completely satisfactory, is well entrenched. The IUPAC document should avoid any clash with other organizations and for the time being some commonly used terms which lack a definite physical basis but have simply stemmed from phenomenological observations should not be included.

The revised document now consists of three sections: (1) General terms; (2) Uniform corrosion of metals and metal alloys; (3) Nonuniform corrosion of metals and metal alloys. An introduction will explain the purpose of the work and its relationship with the compilations of other existing organizations.

S. Trasatti

Commission VI.4 —Atmospheric Chemistry: Dragerwerk AG, FRG, 26–27 November 1984

Tropospheric chemistry project is given priority

Consideration was given to the project proposals drafted 18 May 1984. This document has been submitted to the divisional meeting held in Washington in October 1984. There were three broad areas to be covered by the new commission:

Tropospheric chemistry
Ambient (environmental) atmospheres
Workplace atmospheres

The principal objective of the commission was seen to involve reviewing current sampling and analytical programmes for atmospheric chemistry as a whole in close collaboration with appropriate international experts. The intentions would be to establish acceptable standards of air testing methods for use by all countries involved in carrying out the work. Harmonization of sampling protocols and

analytical methods would permit more reliable comparison of data from the various monitoring agencies/researchers around the world. Such data could then be used with confidence for the preparation of global tropospheric chemistry 'maps' and for the development of global tropospheric chemistry system models (TCSM).

The project proposals were discussed at length. It was felt that a number of working parties would be required. It was also envisaged that most members of such working groups would be taken from existing research groups and that some external (non-IUPAC) funding would be required to support these working parties. Some consideration of potential funding agencies would therefore need to be investigated.

It was agreed to concentrate initial commission efforts on the tropospheric chemistry projects (see below) and that Project I should be put forward for official IUPAC approval. Work on this project would be started immediately with a view to completion prior to the Lyon meeting in September 1985. The information obtained from this project would form a useful database for future projects (2–7).

Proposed projects

1. Inventory of current tropospheric sampling programmes worldwide.
2. Evaluate current knowledge on important tropospheric trace gas concentrations worldwide and identify needs for additional measurements.
3. In cooperation with scientific representatives from various countries propose additional sampling sites.
4. Review of existing instrumental methods of analysis of selected tropospheric trace gases.
5. Workshops for scientific personnel involved in making measurements in the global sampling network to ensure equivalent standards and comparability of measurements.
6. A central data analysis group to collect, collate and analyse data from the network and distribute the data to participating laboratories.
7. Identification and study of trace gas and aerosol problems requiring further investigation in the industrial or laboratory environment.

It is recognized that there should be no overlap with existing atmospheric chemistry research programmes, although emphasis will be placed on liaison and cooperation.

Next meeting

The commission will meet at NCAR, Boulder, USA, on 16–17 May 1985 and again at the 33rd IUPAC General Assembly at Lyon on 2–3 September 1985.

C. J. Purnell

PROVISIONAL RECOMMENDATIONS

IUPAC seeks your comments

The procedure for comment on and approval of IUPAC recommendations on nomenclature and symbols is given in the *IUPAC Handbook 1983–1985*, p. 121. This procedure is now in operation and synopses of the latest Provisional Reports are reproduced below.

It must be emphasized that copies of the full report cannot be obtained from the IUPAC Secretariat but only from your own national/regional centre. The most up-to-date list of national/regional centres appeared in *CI*, Vol. 7, No. 2, p. 13 (1985). Copies will be sent on request but on the understanding that comments will be sent to the address on the document not more than 8 months after publication in *CI*.

A descriptive classification of the electron spectroscopies

This document supplements an earlier IUPAC publication on electron spectroscopy and is intended to provide a source of reference for those interested in discovering the extent to which one or other of the electron spectroscopies might be of value in a particular area of work. It has especial relevance, however, to those interested in applying electron spectroscopy to structural studies in molecular chemistry and to analytical and structural studies of surfaces.

The criterion for inclusion is principally that the use of an energy analyser or monochromator passing selected energies of electrons forms an essential part of the experiment. The different methods can be grouped according to the underlying physical process which is involved. Each section is described in detail with all of the subdivisions which could be discerned as distinctly separate according to the experimental features which were seen to be dominant. This coverage is complete up to January 1983.

In general each subdivision is accompanied by one or more references to leading review articles. In some cases, however, where only a few experiments have been reported in a particular area, there may well be only one or two original papers to refer to.

In many cases the technique is essentially the same whether the area of work relates to isolated atoms or molecules in the gas phase or to the condensed phases, solid or liquid. Because electrons are weakly penetrating through matter the electron spectroscopies have particular value for the study of surfaces.

Comments on these recommendations are welcome and should be sent before the end of March 1986 to: Dr David R. Turner, Physical Chemistry Laboratory, University of Oxford, South Parks Road, Oxford OX1 3QZ, UK.

Ions, radicals and salts (Revision of Red Book: Chapters 1-8)

Definitions of cations, anions, radicals and salts are given which do not deviate significantly from those in the current edition of the Red Book, although in the case of radicals two kinds are distinguished, i.e. those consisting of an atom (or group of atoms) having one or more unpaired electrons, and those consisting of a group of atoms of which the name is used as a prefix in substitutive nomenclature.

Examples of the first category are $(\text{CH}_3)^\cdot$, $(\text{UO}_2)^\cdot$, $(\text{O}_2)^\cdot$; examples of the second category are PO , ClHg (chloromercurio), $\text{CO}(\text{O})^-$ (carboxylato). The section on radicals also deals with charged radicals, as illustrated by the examples given above.

The sections on cations and anions deal with species obtained from organic and inorganic molecules after loss or addition of electrons, of hydrogen ions, or of hydride ions. Coordination nomenclature is used when a central atom of metal character is present, whereas substitutive nomenclature is used in other cases, such as NF_4^+ (tetrafluoroammonium) and $(\text{CH}_3\text{OH}_2)^+$ (methyloxonium). In certain cases special names are introduced or retained, such as NO^+ (nitrosyl cation), Au^- (auride anion), K^- (kalide).

Formulae and names of salts are easily constructed by combination of the names of cations and anions. In double salts the cation and anion names are ordered alphabetically unless other requirements mandate an alternative arrangement. Thus, to emphasize structural similarities AlLaO_3 is often represented as LaAlO_3 (*perovskite-type*).

Comments on these recommendations are welcome and should be sent before the end of March 1986 to: Dr G. J. Leigh, Agricultural Research Council, Unit of Nitrogen Fixation, University of Sussex, Brighton BN1 9RQ, UK.

Elements, atoms, and groups of atoms (Revision of Red Book: Summary of Chapters 1-3)

This chapter defines the basic material for inorganic nomenclature, the atomic symbols and names. It also contains acceptable definitions of fundamental concepts such as element, atomic charge, and nucleide. The basic methods for indicating ionic charge, atomic number, and mass number are described, as well as a system for naming allotropes of the elements which should be of general if not universal utility.

The final section deals with the indication of groups in the Periodic Table. It is recommended that the old A/B system for subgroups be abandoned because of its inconsistent application in different parts of the world, and that a system with group numbers 1–18 (the last being the inert gases) be adopted generally. Some approved names for particular groups of elements, such as halogens and transition elements are also listed.

Comments on these recommendations are welcome and should be sent before the end of March 1986 to: Dr G. J. Leigh, Agricultural Research Council, Unit of Nitrogen Fixation, University of Sussex, Brighton BN1 9RQ, UK.

Recommendations for the presentation of thermodynamic and related data in biology

Thermodynamic data are important in describing and in developing an understanding of biological systems. However, at present there is a marked variation in the terminology and symbols used in this connection. A guide has been prepared in which SI units and symbols of special importance for biothermodynamics are summarized together with examples and with comments concerning their use. It is recognized that in some cases recommendations made by IUPAC may have to be adjusted slightly or developed further in order to suit the practical needs in the biological sciences. In the present report suggestions are given with this purpose in mind.

The overall aim of the report has been to prepare a document which will serve as a practically useful guide for those who are involved in scientific writing and in teaching in the field of biothermodynamics. The document is therefore intended to be largely self-contained. The report has been prepared by the Interunion Commission on Biothermodynamics.

Comments on these recommendations are welcome and should be sent before the end of March 1986 to: Prof. I. Wadsö, Termokemi, Kemicentrum, Lunds Universitet, Box 124, S-221 00 Lund, Sweden.

A classification of linear single-strand polymers

This new classification of linear single-strand organic and inorganic polymers consists of a hierarchical scheme for naming classes of polymers according to the chemical constitution of the repeating units in the main chain. Four levels are used; they are, in order of decreasing importance: classes, subclasses, groups, and individual polymers. Thus, the individual polymer poly(oxyethyleneoxyterephthaloyl) belongs to the group of polyesters of carboxylic acids, the subclass of (oxygen, carbon)-chain polymers, and the class of heterochain polymers. The presence of a specific sidegroup can be indicated by names such as 'hydroxyl-sidegroup polymer'. Many other examples are cited in the text.

Comments on these recommendations are welcome and should be sent before the last day of March 1986 to: Dr N. M. Bikales, Polymer Program, National Sciences Foundation, Washington, DC 20550, USA.

Nomenclature for automated and mechanized analysis

In 1970 the Commission on Analytical Nomenclature of the Analytical Chemistry Division produced the document 'Recommended Nomenclature for Automatic Analysis' (PAC, Vol. 21, pp. 527–531).

In 1978 the Commission on Automation and Clinical Chemical Techniques of the Clinical Chemistry Division, produced the document 'Characteristics and Attributes of Instruments intended for Automated Analysis in Clinical Chemistry' (IUPAC Inf. Bull., No. 3, pp. 233–240, 1978). This document contained a glossary.

Subsequently it was decided by the two Commissions jointly to produce a document to supersede the two previous documents. The aim has been to provide a single document containing terms currently used for automated and mechanized analysis in analytical and clinical chemistry with definitions relevant to their particular use in those areas. Most definitions were taken from the above documents or other appropriate sources, others were elaborated by the two Commissions.

The Expert Panel on Instrumentation of the International Federation of Clinical Chemistry is especially acknowledged for its critical review of draft versions of the present document.

Terms included in this document are listed in an alphabetic index.

Comments on these recommendations are welcome and should be sent before the end of March 1986 to: Prof. G. G. Guilbault, Department of Chemistry, University of New Orleans, Lake Front, New Orleans, Louisiana 70148, USA or Prof. M. Hjelm, Department of Clinical Biochemistry, Hospital for Sick Children, Great Ormond Street, London WC1N 3JH, UK.

IUPAC PUBLICATIONS

The long awaited 'Purple Book' to be published soon

Later this year the *Compendium of Macromolecular Nomenclature* or 'Purple Book' will be published. The book has been prepared by the IUPAC Commission on Macromolecular Nomenclature (IV.1).

The Macromolecular Division of IUPAC has now been in existence for almost 20 years and one of its major activities during that time has been the construction of a systematic nomenclature for polymer structures and properties, mostly with synthetic macromolecules in mind. At the same time biochemists, notably encouraged by the International Union of Biochemistry, have been engaged in parallel work in relation to naturally occurring polymers.

The nomenclature for synthetic polymers is based on the 1974 document Basic Definitions of Terms Relating to Polymers. On this foundation systematic nomenclature has been developed for regular single-strand organic polymers and for regular single-strand and quasi-single-strand inorganic and

coordination polymers. Further, proposals for naming structures have been extended into the realm of copolymers of various kinds. More detailed nomenclature for stereochemical purposes is also included.

In the field of natural polymers, three classes of materials are embraced — polypeptides, polynucleotides and polysaccharides.

The 'Purple Book' brings together all the relevant documents produced up to mid-1985 dealing with both natural and synthetic macromolecules. It therefore represents the current recommendations of IUPAC and IUB at this time.

The book will be published by Blackwell Scientific Publications. It should be about 200 pages and cost in the order of US\$25.

Progress in nickel toxicology

The Third International Conference on Nickel Toxicology was held in Paris, France, September 1984, under the joint sponsorship of the International Union of Pure and Applied Chemistry (IUPAC), the Association of Clinical Scientists, and the Nickel Producers Environmental Research Association (NiPERA). The Conference was attended by 150 participants from 19 countries, including many of the world's authorities on nickel in the areas of trace analysis, biochemistry, radiochemistry, pharmacology, toxicology, pathology, immunology, industrial hygiene, epidemiology, occupational health, and clinical medicine. The text of the Richard T. Barton memorial lecture and synopses of the scientific papers that were presented at the Conference are published in this volume to facilitate rapid communication of progress in nickel toxicology.

The volume was recently published by Blackwell Scientific Publications. It is edited by Stanley S. Brown and F. William Sunderman, Jr, has 256 pp., 50 illustrations and the price is about £32.00. ISBN 0 632 01355 9.

Polymers

The July issue of *PAC* (*Pure and Applied Chemistry*) featured the POLYMER 85 'International Symposium on Characterization and Analysis of Polymers' held in Melbourne, Australia, 11–14 February 1985. Topics of the invited lectures

presented at the Symposium included:

- Conformational analysis of chiral polymers in solution
- Recent advances in Fourier transform infrared spectroscopy of polymers
- Structural defects in polymers — their identification and significance
- Synthesis, structure and properties of liquid crystalline polymers

Rainbow trout and *car* strains

Did you know that astaxanthin is a good pigmenter for rainbow trout? Astaxanthin is a carotenoid. Synthetic carotenoids are becoming increasingly important for the pigmentation of farmed fish, broilers and egg yolk. If we have now whetted your appetite for carotenoids, why not read the paper entitled 'Absorption, retention and metabolic transformations of carotenoids in rainbow trout, salmon and chicken' which appeared in *PAC*, Vol. 57, No. 5, pp. 685–692? This was just one of many lectures presented at the 7th International Symposium on Carotenoids held in Munich, FRG, 27–31 August 1984. Another lecture (pp. 649–658) concerned carotenoids in both photosynthetic and non-photosynthetic bacteria, fungi including yeasts, lichens and algae. A paper on carotenogenic enzymes (pp. 671–673) examined data on the effects of detergents on cell extracts from *car* mutants and *car* strains of *Phycomyces*. Perhaps we should all let the *car* take the strain?

RECENT REPORTS

In this section we publish summaries of the most recent IUPAC Recommendations on Nomenclature and Symbols and Technical Reports. The full texts of these recommendations and reports are published in *PAC*. All those below appeared in *PAC*, Vol. 57, No. 6 (1985).

Relationship between molecular characteristics and physical properties of linear low density polyethylenes

The relationship between molecular characteristics and physical properties of linear low density polyethylenes (LLDPE) was investigated in comparison with low density polyethylenes produced by high pressure processes (HP-LDPE). Differences in molecular characteristics, such as branching structure, spherulite structure and solution properties between LLDPE and HP-LDPE were made clear. A comparison of both polymer films in impact strength and heat resistance was made. The higher Vicat softening point of LLDPE compared with HP-LDPE could be attributed to the thicker lamella of LLDPE than that of HP-LDPE because of the difference of the branching structures. Some comparisons of LLDPE with HP-LDPE on rheological properties and processability parameters were tried. There are apparent differences between both polymers in the dynamic viscoelastic properties and the extensional viscosity development. The melt flow rate value, which is widely used as a processability parameter, of LLDPE is more than one decade lower than that of HP-LDPE at a given molecular weight because of the difference of the molecular dimension. The melt tension, which is another widely used processability parameter, of LLDPE is lower than that of HP-LDPE at a given melt flow rate. The melt tension data also suggest that the melt tension properties and processability are mostly governed by non-linear extensional properties of the melts over a long time-scale.

This report was prepared by the Commission on Polymer Characterization and Properties (IV.2) and was published in *PAC*, Vol. 57, pp. 823–832 (1985).

Defects in the molecular structure of polyvinylchloride and their relation to thermal stability

Thirteen samples of polyvinylchloride especially prepared by different laboratories of the sub-group members were investigated. Quantitative data obtained from spectroscopic, chemical and physical methods of analysis of these samples are sum-

marized in this report. The report also takes into account, for comparison, recent data published in the literature. The need for standardization of thermal stability testing, currently based on dechlorination tests in solution or the solid state, on coloration tests, or rheological measurements, is highlighted.

Correlation between structural defects and degradation rate remains far from clear. The degradation is accepted to be a chain process including initiation, propagation and termination steps; the mechanism of this process, whether radical or ionic, remains under discussion and there is some degree of reversibility. Structural defects are believed to be connected mainly with the initiation process. Further work is needed to reach a better agreement between the data from ^1H and ^{13}C NMR spectra.

This report was prepared by the Commission on Polymer Characterization and Properties (IV.2) and was published in *PAC*, Vol. 57, pp. 833–844 (1985).

Identification and control of purity of acid–base indicators

Commercially available acid–base indicators are frequently mixtures of different compounds, the nature of which is dependent on their origin. Impurities, especially those which are highly coloured, interfere with the practical use of these reagents. It is the purpose of the present report to give simple guidelines for the evaluation of these substances.

The following tests are recommended: (a) determination of moisture content, (b) residue on combustion (or sulphated ash), (c) elemental composition by combustion analysis, (d) recording and evaluation of UV/VIS spectrum, (e) determination of isosbestic points, (f) recording the IR and/or NMR spectrum, (g) examination by TLC, and (h) further methods (e.g. HPLC examination, thermal analysis). These tests are useful for the rapid, initial examination of an indicator and should provide adequate data for an evaluation of its purity. For information concerning the nature of the impurities, more extensive use of HPLC is required. The results obtained with the above tests should be compared with those obtained with compounds of known purity or with published data. The tests may also be used for spectrophotometric reagents and compleximetric indicators whose purity is in doubt. Normally, acid–base indicators of acceptable purity are available for most analytical purposes, but high-precision work in particular requires suitably pure indicators.

This report was prepared by the Commission on Analytical Reactions and Reagents (V.1) and was published in *PAC*, Vol. 57, pp. 845–848 (1985).

Criteria for standardization of pH measurements in organic solvents and water + organic solvent mixtures of moderate to high permittivities

The Report extends pH standardization, now endorsed in aqueous solutions, *PAC*, Vol. 57, pp. 531–542 (1985), to organic solvents and water + organic solvent mixtures of relative permittivities higher than about 30. To achieve this, one of the primary needs is to standardize the procedure for measuring pH values of standard buffer solutions, pH_S , and to determine as many pH_S values as necessary to cover the pH scale in each solvent, within the usual range of temperature. This implies that: (i) the pH value in the solvent s , with reference to the same solvent s , pH_S , is *operationally* defined by the equation $\text{pH}_\text{X} = \text{pH}_\text{S} - (E_\text{X} - E_\text{S})/k$, where the measured emfs E_X and E_S refer to the sample (X) and standard (S) solutions, respectively, and $k = (\ln 10)RT/F$; (ii) the residual liquid junction potential is assumed to be negligible; (iii) the assignment of the reference value standard, pH_S , is performed by a procedure which is parallel to that already endorsed for aqueous solutions, provided that the appropriate physical constants for the solvent are used.

Point (iii) requires that the Bates–Guggenheim convention for the calculation of the activity coefficient of chloride ion, γ_{Cl} , is extended to organic solvents and aqueous organic solvent mixtures provided that the appropriate A , B and a_0 constants are used. If alternative conventions are used, it is strongly recommended when reporting newly determined pH_S data that the conventional expression for γ_{Cl} adopted is specified, and in particular which a_0 value was selected, so the user can make the necessary corrections.

This report was prepared by the Commission on Electroanalytical Chemistry (V.5) and was published in *PAC*, Vol. 57, pp. 865–876 (1985).

Recommendations for the determination of pH in low ionic strength freshwaters

The problems of the measurement of the operational pH in low-ionic-strength media such as freshwaters are reviewed. These problems include contamination of the sample by the glass or reference electrodes, stirring errors and circuit disruption affecting the time response of the electrodes, but the principal source of error arises from deficiencies in the performance of commercial, restrained diffusion, reference electrodes. A flow cell method with renewable, free diffusion, liquid junction is recommended to obtain reproducible values. Comments are made on procedures needed for the measurement of pH of acidic water samples ('acid rain' samples).

This report was prepared by the Commission on Electroanalytical Chemistry (V.5) and was published in *PAC*, Vol. 57, pp. 877–886 (1985).

Procedures for testing pH responsive glass electrodes at 25, 37, 65 and 85 °C and determination of alkaline errors up to 1 mol dm⁻³ Na⁺, K⁺, Li⁺

A new method has been developed for testing glass electrodes over the pH range 0–14 at 25 °C in the absence of alkali metal ions, in the presence of Na⁺, K⁺, Li⁺ at high pH, and extended to 37 °C for clinical usage and to higher temperatures (65, 85 °C). The method is based on indirect comparison with results for hydrogen gas electrodes but uses silver–silver chloride reference electrodes in cells without liquid junction. With specially developed chloride-containing test buffers, it is now possible to determine the errors of glass electrodes with an accuracy of ± 1.2 mV (± 0.02 pH) over the normal pH range at 25, 65 and 85 °C and to measure Na⁺, K⁺, Li⁺ errors at up to 1 mol dm⁻³ cation at constant pH for pH 6.5 at 25 °C. Examples are given from results of testing commercial electrodes.

This report was prepared by the Commission on Electroanalytical Chemistry (V.5) and was published in *PAC*, Vol. 57, pp. 887–898 (1985).

Standard method for the determination of total sterols in fats and oils (including results of a collaborative study)

The identification and quantitative estimation of the components in fats and oils mixtures needs, beside the relative composition of the sterols (sterol profile), the quantitative determination of the total sterol content.

An appropriate enzymatic method is described. Hydrogen peroxide is quantitatively formed during oxidation of sterols to sterones with cholesterol oxidase. A simultaneous oxidation (with catalase) of methanol by the formed hydrogen peroxide leads to the quantitative formation of formaldehyde. Finally, formaldehyde reacts with acetylacetone, giving quantitatively 3,5 diacetyl 1,4 dihydrolutidine, which is spectrometrically determined at 410 nm. The spectrometric determination is expressed either as cholesterol (animal fats) or as β -sitosterol (vegetable fats and oils).

Four samples of fats and oils were studied collaboratively by sixteen laboratories. The obtained results were studied statistically, according to the ISO Standard n° 5725. The intralaboratory repeatability is good (coefficient of variation lower than 5% for mean values from 135 to 695 mg per 100 g). The interlaboratory reproducibility is only acceptable (C.V. around 15%), due probably to the fact that most of the participants were not familiar enough with the method. Nevertheless, the method has been adopted as a Standard Method for the Analysis of Fats and Oils.

This report was prepared by the Commission on Oils, Fats, and Derivatives (VI.3) and was published in *PAC*, Vol. 57, pp. 899–904 (1985).

OTHER PUBLICATIONS

The Royal Irish Academy: a bicentennial history 1785–1985

This 368-page book tells the story of the Royal Irish Academy. Founded in 1785, its objects were the study of the country's antiquities, the advancement of science, and research in what was then described as polite literature. Internationally the Academy has agreements of long standing with the Royal Society and British Academy, while recently it has forged links with the academic institutions in Austria, France, Germany, Poland and the USSR. It is the Irish representative on most international learned associations and participates in a number of international research projects.

The book includes a chapter on 'Chemistry' written by Prof. Eva M. Philbin, Emeritus Professor of Organic Chemistry, University College, Dublin. This is a fascinating chapter. It starts with a description of Kirwan's work and publications such as 'Observations on coal-mines' and 'Experiments on the alkaline substances used in bleaching, and on the colouring matter of linen-yarn'. Prof. Philbin then takes us right through to the present day. She describes, for example, the work of Dr Vincent C. Barry (President, 1970–73) at Trinity College, Dublin, on the synthesis and testing of drugs to treat tuberculosis and leprosy.

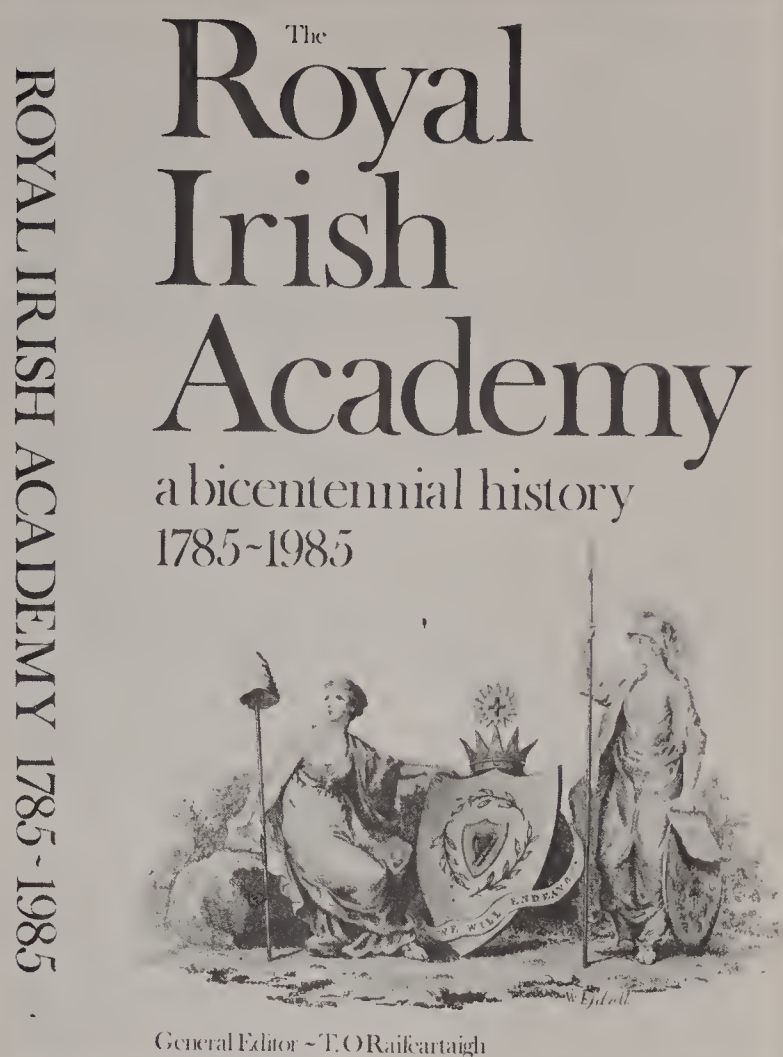
One of the most important of these was clofazimine which has undergone extensive clinical trials in leprosaria in some thirty countries. The members of the team who discovered clofazimine — Drs J. G. Belton, M. L. Conalty, J. F. O'Sullivan and D. Twomey — were awarded the 1980 UNESCO Science Prize for 'an outstanding contribution, through the application of science' to the advancement of the developing member countries.

The book is published by The Royal Irish Academy at £27.00. It is available from The Royal Irish Academy, 19 Dawson Street, Dublin 2, Ireland.

The International Programme on Chemical Safety (IPCS)

Sentinel: Health and Environmental International, Vol. 1, No. 2, November 1984. This is the news magazine of the IPCS. It is published three times a year. This issue contains items on a world notification scheme for harmful chemicals; assessment of chemical damage and a Global Environment Monitoring Systems (GEMS) project for monitoring water pollution.

Chemistry International, 1985, Vol. 7, No. 4



International Council of Scientific Unions (ICSU)

International Newsletter on Science Technician Training No. 4, October 1984. This Newsletter is published by the ICSU Committee on the Teaching of Science (CTS) with financial support from the Division of Technological Research and Higher Education, UNESCO. It contains several articles on technician training in developing countries.

ICSU Committee on Data for Science and Technology (CODATA)

CODATA Newsletter No. 31, January 1985. This contains details of a workshop on Directions for Internationally Compatible Environmental Data, tentatively planned for May 1986 in Montreal, Canada. There is also an article on Reporting Electrochemical Data containing 'pertinent data-reporting details expanded from a Jerusalem CODATA Conference presentation'. For further information about CODATA and its activities see *CI*, Vol. 7, No. 1, pp. 10–16 (1985), or write to CODATA Secretariat, 51 Boulevard de Montmorency, F-75016 Paris, France.

The ICSU Ringberg Conference

Schloss Ringberg, Tegernsee, Federal Republic of Germany,
7–9 October 1985

On the recommendation of the ICSU Executive Board, a special three-day conference is being arranged to examine ICSU's contemporary and future role in international scientific cooperation. The conference, which will be limited in size and therefore attended by invitation only, will be held at the Schloss Ringberg outside Munich, just prior to the October 1985 session of the ICSU General Committee.

The three-day meeting will make a critical examination of the future orientation needed to enable ICSU to respond to the needs of researchers, of national institutions, and of other organizations in the international sphere. The invited participants from many parts of the world will include scientists active in ICSU, others not directly involved, and some non-scientists.

The principal officers of ICSU will set the stage for the discussion with a background paper outlining their perspective on the challenges facing ICSU and its capabilities, present and prospective. They will emphasize in their overview the constantly changing international context for cooperation in science, a condition that cannot help but pose problems for ICSU. Following this general introduction, a group of distinguished senior scientists not closely connected with ICSU will participate in a round-table discussion of important problems of international science in its widest aspects.

Several general themes will be reflected in the subsequent conference discussions which will include both plenary sessions and meetings of working groups.

The *general themes* will be:

— What should be the future orientation of ICSU to

allow it to attain its full potential in the next decade?

- How will ICSU make this new orientation a reality?
- How will ICSU ensure a process of continuing critical review of its activities and structure?
- How can ICSU improve the effectiveness of communication between its members and its governing bodies?
- How can ICSU mobilize the financial resources and the professional staff needed to carry out its agreed objectives?

Working groups will consider the following topics:

The diverse roles of science. How effectively does ICSU realize its multiple objectives with respect to (i) international, multidisciplinary cooperation at the frontiers of science; (ii) science and technology for development; (iii) science as a factor in societal and cultural change; and (iv) the resolution of ethical problems arising in the practice of science?

Intellectual spectrum and reach of ICSU. How should ICSU define its intellectual spectrum and reach? How should ICSU relate to the medical sciences, the social sciences and engineering?

Past and future global projects. What can we learn from the successes and failures of past and present global projects? How can we design future projects more effectively in the contemporary context?

ICSU's external partners. How can ICSU better match the needs for broadened partnerships through a deeper understanding of the relations between intergovernmental and non-governmental organizations, and take account of the increasing complexity of science–government relationships?

. . .99, 100!

The Association of Official Analytical Chemists (AOAC) will be holding their 99th and 100th Annual International Meetings in Washington DC, USA, on 27–31 October 1985 and 12–16 October 1986 respectively. For further details contact Margaret Ridgell, AOAC, 1111 North 19th Street, Suite 210, Arlington, VA 22209, USA.

If you would like to meet an astronaut — or at least hear one speak — you might think of attending the 11th Annual AOAC Spring Training Workshop

and Exposition in Seattle, Washington, USA, 27–30 April 1986. A NASA astronaut will be just one of the speakers at this Workshop. The technical programme of the Workshop offers chemists sessions on methodology and equipment relating to the analysis of food, fertilizers, drugs, cosmetics and the environment. For further details contact H. Michael Wehr, Oregon Department of Agriculture, Laboratory Services Division, 635 Capitol Street NE, Salem, OR 97310, USA.

Clinical Chemistry

The XII International Congress of Clinical Chemistry was held in Rio de Janeiro, Brazil, 29 April–4 May this year. The meeting included 8 plenary lectures, 18 symposia and 12 workshops.

About 2000 registered participants attended the Congress. The international participation was similar to that of previous International Federation of Clinical Chemistry (IFCC) meetings. However, the number of participants from Brazil and other South and Central American countries dropped from the 1500 expected to about 500.

The educational aspects of the meeting were very successful. The 'Symposium on Teaching' was of particular interest. During the Congress the IUPAC Commission on Teaching and on Automation and Clinical Chemical Techniques held regular sessions. The workshops were very well attended in spite of being held in early or late hours. The scientific programme was not outstanding although reasonably good.

Some unfavourable comments were raised by some industries on the cost of the exhibition. I do not consider these fair comments, since the year before at the IFCC Conference at Rungstedgaard, the IFCC Corporate Affiliates did not express any objection to the well-detailed written description of the costs presented by the organizers.

Several open meetings of IFCC Expert Panels were held. At the moment the publication of the proceedings is not foreseen.

San Francisco was chosen as the venue of the 1990 IFCC Congress.

Prof. Norberto Montalbetti

Networking in Terminology

The Second Infoterm Symposium entitled 'Networking in Terminology: International Cooperation in Terminology Work' was held in Vienna, Austria, 14–17 April this year.

The general programme for this Symposium appeared in *CI*, Vol. 7, No. 1, p. 28 (1985). It brought together over 200 people from 40 countries, all interested in terminology, but of widely varied backgrounds. A few scientists and engineers were in attendance, but I was the only chemist.

Sessions were held at the modern building of the Austrian Chamber of Commerce. Presentations were given in either English or French with simultaneous translation available. Topics ranged from case histories of the development of terminology in specific fields, such as the one I presented on the role of IUPAC in chemical terminology, to descriptions of the operations of various terminology data banks and the educational aspects of terminology work.

My paper precipitated much interest in IUPAC terminology activities and in the new publications procedure. In addition, two receptions and regular coffee breaks provided opportunities for making numerous personal contacts and for preaching the gospel of IUPAC.

Kurt L. Loening

Large Chemical Plants

The 6th Conference on Large Chemical Plants will be held in Antwerp, Belgium 9–11 October 1985. The Conference is sponsored by the European Federation of Chemical Engineering. The Conference language is English and the registration fee after 1 August 1985 is 15 000 BF. For further details write to: K.VIV–L.C.P.6, Jan van Rijswijklaan 58, B-2018 Antwerp, Belgium.

IUPAC-SPONSORED CONFERENCES

Details available on IUPAC-sponsored conferences up to August 1986 are given below. The latest brochures are available from the organizers listed in the Conference Calendar on pp. 47–49.

The 2nd International Symposium on Hydrothermal Reactions: State College, Pennsylvania, USA, 12–14 August 1985

A brief note on this Symposium was included in *CI*, Vol. 7, No. 3, p. 6 (1985). The following details have since become available.

Sessions of both oral and poster papers have been organized on the following hydrothermal topics:

- physical chemistry
- experimental methods
- hydrometallurgy

- geochemistry
- crystal growth
- materials preparation

Papers, all in English, are included from authors from 10 countries, providing thereby an overall international view of progress in hydrothermal sciences. Plenary lectures include:

- Recent physical chemical results on hydrothermal systems (E. U. Franck, FRG)
- Thermodynamics of aqueous NaCl above 300°C including both steam and brine phases (K. S. Pitzer, USA)



Pennsylvania State University.



Keio Plaza Hotel, Tokyo.

Advances in hydrothermal geochemistry (T. M. Seward, New Zealand)

Thermodynamics of hydrothermal systems — Review of studies in the USSR, 1982–1985 (I. L. Khodakovsky, USSR)

Hydrothermal synthesis of new compounds (L. N. Demianets, USSR)

The Symposium will take place in the centre of Pennsylvania on the main campus of the University. On this rural campus, established in 1855, 33 000 students are enrolled. The adjacent town of State College lies among the rolling ridges and valleys of the folded Appalachian Mountains, popular in this region for camping and fishing. In August the weather is normally hot and dry during the day and cool at night. The average daily high temperature is 28°C and the average daily low temperature is 17°C. Rainfall occurs on average during one of every three days, mostly in thundershowers. All meeting rooms, restaurants, and hotels are air conditioned.

8th International Conference on Chemical Education (8-ICCE): Tokyo, Japan, 23–28 August 1985

The main theme of the Conference is 'Widening the Scope of Chemistry'. This includes looking at chemical education from various viewpoints, such as those of chemistry specialists, adult citizens, and school pupils.

Details of Conference activities, including plenary and invited lectures, were given in *CI*, Vol. 7, No. 3, p. 7 (1985).

The venue of the Conference is the Keio Plaza Hotel in Shinjuku, Tokyo. The Tokyo area is now immense and Shinjuku, which is one of the busiest sections of the city, is called a sub-centre of Tokyo. There, one can see skyscrapers and shopping districts in addition to the traditional Japanese gardens. There is direct limousine bus service between Tokyo International Airport and the Keio Plaza Hotel, which takes about 90 minutes.

Various social events have been arranged. These include a get-together party, a National night, excursions, and the Conference banquet. There will also be family programmes. In addition, the Organizing Committee have arranged pre- and post-conference tours to Nikko, Kyoto, and the Science Fair (EXPO) in Tsukuba.

It is hoped that during the Conference the participants will thus be able to observe many of the interesting aspects of both modern and classical Japanese culture and that these experiences will provide pleasant memories of Japan.

3rd Noordwijkerhout Symposium on Innovative Approaches in Drug Research Noordwijkerhout, Netherlands, 3–6 September 1985

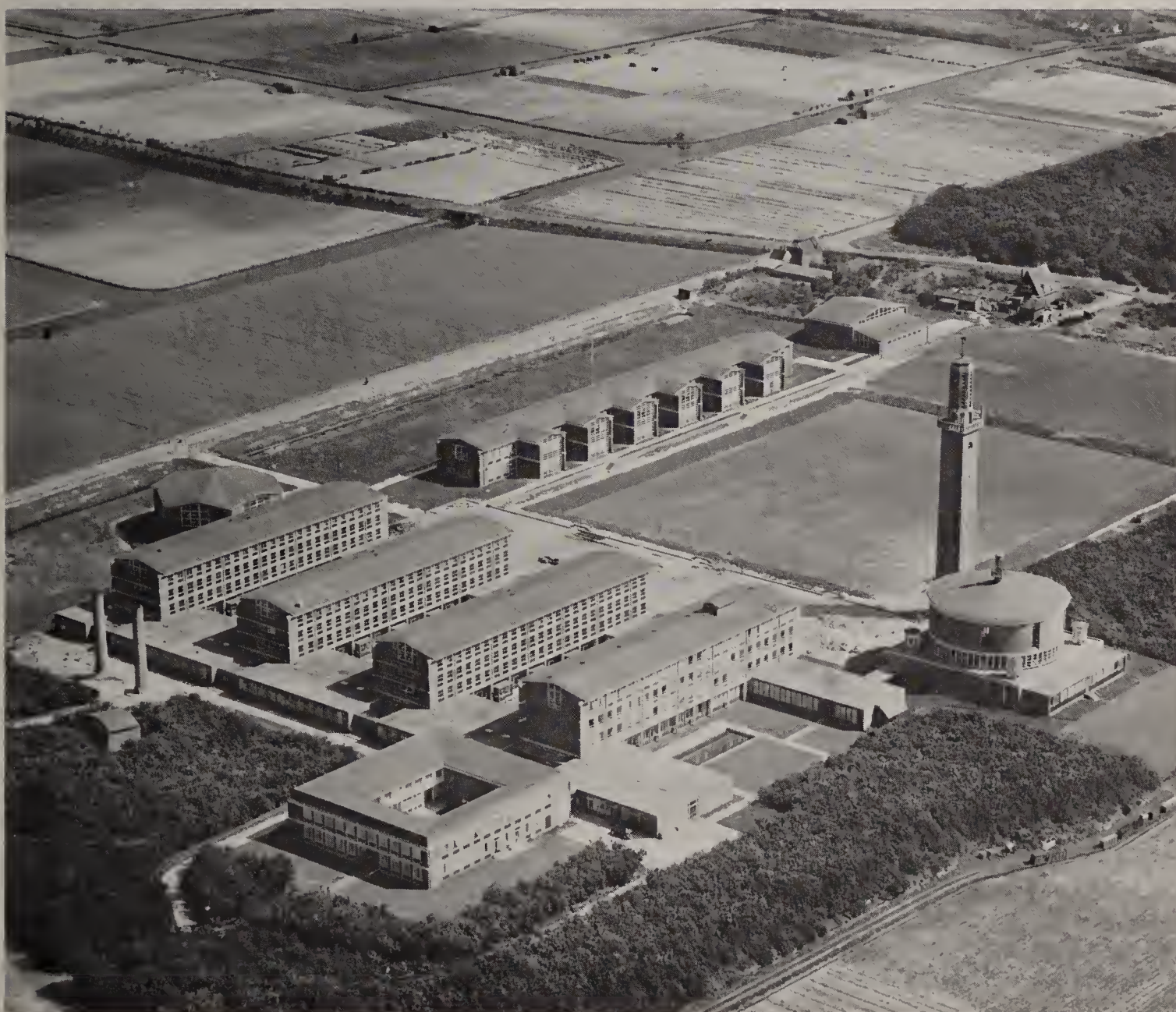
The main topics of the Symposium are:

- Innovative approaches in drug research
- Receptors and preliminary screening in drug development
- Drugs and macromolecules; structures and modelling
- New developments in chemotherapy
- Natural products and medicinal chemistry
- Topics of current interest

In addition 'Satellite programmes' on the following topics have been arranged for Tuesday 3 September:

- The role of Stereochemistry in the development of new selective drugs
- SAR and design of anti-tumour agents

The Symposium language will be English. There will be no translation service.



Leeuwenhorst Conference Centre, venue of the 3rd Noordwijkerhout Symposium (photo courtesy of KLM Aerocarto).

The programme includes poster sessions. These posters will deal with studies related to the symposium topics and will be subjected to a selection procedure.

The registration fee is Dfl.450,- (Dutch guilders). These fees include the proceedings of this symposium. For accompanying members the fee is Dfl.35,-. For participation in one of the two satellite symposia, an extra fee of Dfl.35,- is required. Costs for accommodation for active members as well as for accompanying members arriving Monday 2 September will be Dfl.595,-, including all meals, coffee and tea and official dinner. For those arriving on Tuesday 3 September, costs for accommodation, etc. will be Dfl.546,-.

Informal dress may be worn on all occasions. The average daytime temperature in the Netherlands in early September usually is 18°C (62°F). A raincoat or umbrella is recommended.

The night after the symposium and over the following weekend there will be a possibility for participants to stay at the 'Leeuwenhorst'.

The 2nd International Workshop on Vapor-Liquid Equilibria in 1-Alkanol + *n*-Alkane Mixtures: Paris, France, 5–7 September 1985

This is one of three meetings on Phase Equilibrium and Related Property Data to be held in Paris in September. The other two meetings are:

The First CODATA Symposium on Chemical thermodynamic and Thermophysical Properties Databases

The Second CODATA Symposium on Critical Evaluation and Prediction of Phase Equilibria in Multicomponent Systems

Participants are free to choose attendance at any event of interest to them or any combination of two events or all three events.

The 2nd International Workshop is part of a project the objective of which is to work out a set of recommended data mainly on low-pressure vapor-liquid equilibrium and related properties for binary 1-alkanol + *n*-alkane mixtures.

The specific objectives of the 2nd Workshop are:

- Comparison of individually selected data sets (recommended data)
- Identification, discussion, and clarification of conflicting views (if any)
- Discussion on the format of the Final Report and appointment of the Editorial Board
- Discussion of future activities and meetings

The official Conference languages are French and English.

The three meetings will be held at the Maison Internationale (International House) which is one of the many buildings of the Cité Internationale Universitaire de Paris. A limited amount of on-campus, student dormitory-style, accommodation is available at relatively low cost. Such accommodation may be rented for a minimum of five days. The cost

per person per day is FF 120 single or FF 90 double.

The registration fee for the 2nd International IUPAC Workshop is FF 450. For all three meetings the registration fee is FF 2000.

1986 Prague Meetings on Macromolecules:

29th Microsymposium on Macromolecules — Synthetic Polymeric Membranes:

Prague, Czechoslovakia, 7–10 July, 1986

The microsymposium will be held at the Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences. The themes of the microsymposium will be:

Theoretical and experimental studies of the relations between the chemical composition, structure and properties of polymer membranes: current status and anticipated trends in the topical research areas

The microsymposium will include invited lectures and contributed papers presented as posters. Topics covered by the microsymposium will include:

Chemistry and structure of membranes for electrolysis and electrodialysis processes
Membranes for pressure-driven processes
Membranes for concentration driven processes (hemodialysis, dialysis)
Nonisothermal membrane phenomena
Methods for investigation of membranes and processes

9th Discussion Conference — Crosslinked Epoxies: Prague, Czechoslovakia, 14–17 July 1986

This conference will be held at the Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences. The themes of this discussion conference will be:

Theoretical and experimental studies of curing of polyepoxides: dependence on composition, structure of components, and curing regime
Elucidation of the curing mechanism and its effect on network build-up
Use of modern physical methods in characterizing changes in rheological, viscoelastic and optical properties during cure, segmental mobility and mechanical properties of cured epoxies
Epoxy composites: characterization of interaction between the matrix and reinforcements and its effect on mechanical and ageing properties
New applications involving epoxies

The conference will include invited lectures, contributed papers presented as posters and discus-

sion sessions. Topics covered by the conference will include:

- Characterization of epoxy resins and epoxy curing agent systems
- Mechanism and kinetics of curing reactions. Study of model systems. Curing kinetics of polyfunctional systems
- Theory of network formation in curing and comparison with experiments
- Characterization of structure and mobility in cured resins
- Physical properties of cured resins. Curing and vitrification
- Epoxies as matrices for composites. Interaction between the matrix and reinforcements. Toughened epoxies. Chemical and physical ageing
- Mechanical properties of epoxy composites
- Advanced epoxies, curing agents and composites
- New applications (adhesives, coatings, construction, electrical/electronics, laminates, etc.)

2nd International Symposium on Solubility Phenomena: Newark, New Jersey, USA, 12–15 August 1986.

The scientific meetings of this Symposium will be held at the New Jersey Institute of Technology,

Newark, USA. Subject matter will include:

- solubilities of drugs and related compounds
- solubilities in hydrocarbon/petrochemical systems
- solubilities in natural waters
- solubilities of polymer systems
- solubility phenomena in rock formations
- solubilities in molten salts, metals, slags and glasses
- solubilities of non-electrolytes
- solubility of gases
- phase diagrams: theory and practice
- correlations and predictions of solubility data
- high pressure solubilities
- methods of critical evaluation of data
- new solubility data of broad theoretical interest
- theories of solubility
- vapor–liquid equilibria
- links between thermochemistry and solubility of solids
- applications of solubility data
- enthalpies of solution

The official language of the Conference will be English, and no simultaneous translation will be provided.

Cultural and recreational activities are easily available in nearby New York City and the Meadowlands Sports Complex. The city is well served by local, national and international transport facilities. Hotel accommodation in the surrounding area is available (US\$50–80) and in the university dormitory, US\$20 per day (single), US\$15 per day (per person, double occupancy).

CONFERENCE CALENDAR

1985

Heterocyclic Chemistry

August 11–16. 10th International Congress of Heterocyclic Chemistry. Waterloo, Ontario, Canada.

(Ms Margaret Gerth, Tenth ICHC, The Guelph–Waterloo Centre for Graduate Work in Chemistry, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.)

Hydrothermal Reactions

August 12–14. 2nd International Symposium on Hydrothermal Reactions. University Park, Pennsylvania, USA.

(Prof. H. L. Barnes, Professor of Geochemistry and Director of Ore Deposits, College of Earth and Mineral Sciences, The Pennsylvania State University, 235 Deike Building, University Park, Pennsylvania 16802, USA.)

Cationic Polymerization

August 12–15. 7th International Symposium on Cationic Polymerization and Related Processes. Jena, German Democratic Republic.

(Dr R. H. Wondraczek, Sektion Chemie, Friedrich–Schiller-Universität, DDR-6900 Jena, German Democratic Republic.)

Macromolecules

August 18–23. 30th International Symposium on Macromolecules: The Hague, Netherlands.

(30th International Symposium on Macromolecules, c/o QLT Convention Services, Keizersgracht 792, 1017 EC Amsterdam, Netherlands.)

Thermal Analysis

August 19–23. 8th International Conference on Thermal Analysis. Bratislava, Czechoslovakia. (Dr O. Korab, The Organizing Committee of the 8th ICTA, c/o Slovak Technical University, 812 43 Bratislava, Czechoslovakia.)

Chemical Education

August 23–28. 8th International Conference on Chemical Education: Widening the Scope of Chemistry. Tokyo, Japan. (Prof. J. T. Shimozawa, Secretary General of 8-ICCE, c/o The Chemical Society of Japan, 1–5 Kanda-Surugadai, Chiyoda-ku, Tokyo, 101 Japan.)

Mathematics and Chemistry

September 2–5. International Symposium on Applications of Mathematical Concepts to Chemistry. Dubrovnik, Croatia, Yugoslavia. (Prof. Lj. Ruščić, The Rugjer Bošković Institute, PO Box 1016, Bijenicka 54, YU-41001 Zagreb, Croatia, Yugoslavia.)

Marine Natural Products

September 2–6. 5th International Symposium on Marine Natural Products. Paris, France. (Dr A. Ahond, Institut de Chimie des Substances Naturelles, CNRS, F-91190 Gif-sur-Yvette, France.)

Innovative Approaches in Drug Research

September 3–6. 3rd Noordwijkerhout Symposium on Innovative Approaches in Drug Research. Noordwijkerhout, Netherlands. (Prof. H. Timmerman, Department of Pharmacochemistry, Vrije Universiteit, De Boelelaan 1083, 1081 HV Amsterdam, Netherlands.)

Vapor–Liquid Equilibria

September 5–7. 2nd International Workshop on Vapor–Liquid Equilibria in 1-Alkanol + *n*-Alkane Mixtures. Paris, France. (Dr H. V. Kehiaian, Laboratoire de Chimie Organique Physique, Institut de Topologie et de Dynamique des Systèmes, Université Paris VII, 1 rue Guy de la Brosse, F-75005 Paris, France.)

Organometallic Chemistry

September 8–13. 12th International Conference on Organometallic Chemistry. Vienna, Austria. (Prof. K. Schlögl, Institut für Organische Chemie der Universität Wien, Währingerstrasse 38, A-1090 Wien, Austria.)

Mass Spectrometry

September 9–13. 10th International Mass Spectrometry Conference. Swansea, UK. (Dr F. M. Harris, Royal Society Research Unit, University College of Swansea, Swansea SA2 8PP, UK.)

IUPAC Congress

September 9–13. 30th International Congress of Pure and Applied Chemistry. Manchester, UK. (The Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Spectroscopy

September 15–21. 24th Colloquium Spectroscopicum Internationale (CSI XXIV). Garmisch-Partenkirchen, Federal Republic of Germany. (Dr J. Wendenburg, Gesellschaft Deutscher Chemiker, Carl Bosch-Haus, Postfach 900440, Varrentrappstrasse 40-42, D-6000 Frankfurt/Main 90, Federal Republic of Germany.)

Mössbauer Effect

September 16–20. International Conference on the Applications of the Mössbauer Effect. Leuven, Belgium. (Prof. R. Coussemant, Instituut voor Kern- en Stralingsfysika, Celestijnenlaan 200 D, B-3030 Leuven, Belgium.)

Chemical Resources of the Ocean

September 23–27. CHEMRAWN IV: The Global Ocean — Its Chemistry and Resources. Woods Hole, Massachusetts, USA. (CHEMRAWN IV Coordinating Office, Oceanography Program, The University of Michigan, 2455 Hayward Avenue, Ann Arbor, Michigan 48109-2143, USA.)

Medicinal Natural Products

November 10–14. International Symposium on Organic Chemistry of Medicinal Natural Products. Shanghai, China. (Prof. Wang Yu, Chairman, Organizing Committee, International Symposium on Organic Chemistry of Medicinal Natural Products (IUPAC), 345 Lingling Lu, Shanghai 200032, China.)

1986

Biological Reference Materials

April 24–25. Second International Symposium on Biological Reference Materials. Neuherberg, Munich, FRG. (Dr M. Stoeppler, Institut für Chemie der Kernforschungsanlage, Jülich GmbH, Institut 4: Angewandte Physikalische Chemie, Postfach 1913, D-5170 Jülich 1, Federal Republic of Germany.)

Organic Chemistry of Technological Processes

June 1–6. International Symposium on Organic Chemistry of Technological Processes. Jerusalem, Israel.
(Prof. D. Vofsi, The H. Levine Center for Industrial Research, Weizmann Institute of Science, Rehovot 76100, Israel.)

Ring-Opening Polymerization

June 22–26. 5th International Symposium on Ring-Opening Polymerization. Blois, France.
(Dr N. Spassky, Laboratoire de Chimie Macromoléculaire, Université Pierre et Marie Curie, Tour 44, 4 place Jussieu, F-75230 Paris Cédex 05, France.)

Synthetic Polymeric Membranes

July 7–10. 29th Microsymposium on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Crosslinked Epoxides

July 14–17. 9th Discussion Conference on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Analytical Chemistry

July 20–26. SAC 86: International Conference on Analytical Chemistry. Bristol, UK.
(The Secretary, Analytical Division, Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Organic Synthesis

August 10–15. Sixth International Conference on Organic Synthesis. Moscow, USSR.
(Prof. N. K. Kochetkov, N.D. Zelinsky Institute of Organic Chemistry, Academy of Sciences of the USSR, Leninsky prospect 47, SU-117913 Moscow B-334, USSR).

Pesticide Chemistry

August 10–15. 6th International Pesticide Chemistry Congress. Ottawa, Canada.
(The Chemical Institute of Canada, 151 Slater Street, Suite 906, Ottawa, Ontario, Canada K1P 5H3.)

Solubility Phenomena

August 12–15. 2nd International Symposium on Solubility Phenomena, Newark, New Jersey, USA.
(Dr M. Salomon, Symposium Co-Chairman, PO Box 254, Fair Haven, New Jersey 07701, USA.)

Non-aqueous Solutions

August 17–21. 10th International Conference on Non-aqueous Solutions. Leuven, Belgium.
(Dr G. Maes, Department of Chemistry, University of Leuven, Celestijnenlaan 200F, B-3030 Heverlee, Belgium.)

Natural Products

August 17–23. 15th International Symposium on the Chemistry of Natural Products. The Hague, Netherlands.
(Dr G. J. Koomen, Secretary, 15th IUPAC International Symposium on the Chemistry of Natural Products, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, Netherlands.)

Physical Organic Chemistry

August 24–29. 8th IUPAC Conference on Physical Organic Chemistry, Tokyo, Japan.
(Prof. M. Ōki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

Coordination Chemistry

August 24–29. 24th International Conference on Coordination Chemistry. Athens, Greece.
(Dr Ersi Vrachnou-Astra, Department of Chemistry, Nuclear Research Center 'Demokritos', 153 10 Aghia Paraskevi, Athens, Greece.)

Raman Spectroscopy

August 31–5 September. 10th International Conference on Raman Spectroscopy. Eugene, Oregon, USA.
(Prof. Warner L. Peticolas, Department of Chemistry, University of Oregon, Eugene, Oregon 97403-1210, USA.)

1987

CHEMRAWN VI

May 17–22. CHEMRAWN VI. World Conference on Advanced Materials Needed for Innovations — Energy, Transportation and Communications. Tokyo, Japan.
(Mr H. Hamada, Executive Director, The Chemical Society of Japan, 1–5 Kanda-Suragadai, Chiyoda-ku, Tokyo, Japan.)

Modified Polymers

(«Die Makromolekulare Chemie», Supplement 8)

Conference Editor: A. Romanov

1984, VII, 117 pp., DM 44.00 / US-\$ 15.00 + postage

ISBN 3 857 390 085

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This volume contains the main lectures presented at the Sixth Bratislava International Conference on Modified Polymers, held in Bratislava, Czechoslovakia, 2–5 July 1984, under the sponsorship of IUPAC. The conference was concerned with the following topics: Copolymerization, Polymer mixtures, Postreaction of polymers.

International Polymer Chemistry Meeting, Leuven

(«Die Makromolekulare Chemie», Supplement 13)

Conference Editors: M. Van Beylen, F.C. De Schryver

1985, V, 203 pp., DM 60.00 / US-\$ 19.50 + postage

ISBN 3 857 390 131

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This volume contains the invited lectures presented at the Polymer Chemistry Meeting in honour of Professor G. Smets, held at the Katholieke Universiteit, Leuven, Belgium, 26–28 September 1984, under the sponsorship of IUPAC.

In view of the main research activities of Professor Smets, the lectures are mainly devoted to Block and Graft Copolymerization and Mechanisms, Polymer Transformation Reactions and Polymer Photochemistry.

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ORGANOSILICON AND BIOORGANOSILICON CHEMISTRY:

Structure, Bonding, Reactivity and Synthetic Application



Editor.

H. SAKURAI, Department of Chemistry, Tohoku University, Sendai, Japan

The rapid growth of organosilicon chemistry in the past 20 years, coupled with the advent of highly reactive organosilicon intermediates, has stimulated interest amongst both experimental and theoretical chemists in industry and academia. Developments in the silicon industry are currently pointing the way to new applications, e.g. in pre-ceramics and electronic materials.

This broad and comprehensive overview of organosilicon chemistry looks at all new trends in the field, and will take its place among the definitive and standard works of chemistry. It stresses the booming applications of organic synthesis, and describes the new uses of silicon compounds to the electrical, electronic and other industries in high technology. Many new classes of compound, reactions and novel structures from universities and industries world wide are covered by acknowledged experts in organosilicon chemistry: their range of international contributions also review silicon-silicon and silicon-carbon double bonds as crystalline materials.

The work derives from the Seventh International Symposium on Organosilicon Chemistry held in Kyoto, Japan: all the Plenary and Invited Section lecturers were carefully selected and their work systematically edited by Professor Hideki Sakurai.

Contents: Stable Silicon Double Bonds; Theoretical Approach and Reactive Intermediates; Reaction Mechanism and New Compounds; Silicon in Organic Synthesis; Bioorganosilicon Chemistry and Further Applications.

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The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary, non-governmental, non-profit association of organizations, each of which represents the chemists of a member country. Its objectives are:

- to promote continuing co-operation among the chemists of the member countries;
- to study topics of international importance to pure and applied chemistry which need regulation, standardization, or codification;
- to co-operate with other international organizations which deal with topics of a chemical nature;
- to contribute to the advancement of pure and applied chemistry in all its aspects.

The membership of IUPAC presently comprises 44 countries, each represented by a national organization, such as an academy of science or research council.

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Contents 1985, Vol. 7, No. 4 (August)

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Chemistry International

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)



1985, Vol. 7, No. 5 (October)

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CHEMISTRY INTERNATIONAL

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)

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SUBSCRIPTIONS

Six issues of *Chemistry International* will be published in 1985. The 1985 subscription rate including postage is £26 (UK), £31 (overseas), US \$40 (USA and Canada). The individual subscription rate is US\$20. Microfiche subscriptions are available simultaneously with the printed edition, and microfilm at the end of the subscription year. Subscription orders may be placed directly with IUPAC's official publisher, Blackwell Scientific Publications Ltd, PO Box 88, Oxford, England.

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The news magazine is delivered to North America by accelerated surface post and subscribers there can expect to receive their copies within two weeks of British publication. Current issues for the Indian Sub-Continent, Australasia and the Far East are sent by air to regional distribution points from where they are forwarded to subscribers by surface mail. Any back numbers are normally despatched by surface to all regions, except North America where they are sent by a.s.p., and India, where they are sent by air freight.

REPRODUCTION OF ARTICLES

Reproduction or translation of articles in this issue is encouraged, provided that it is accompanied by a reference to the original publication in *Chemistry International*, unless there is a footnote to the contrary.

Front cover: View from the École Supérieure de Commerce de Lyon during the General Assembly.

Before and after Lyon

This is a curious issue to edit. I can imagine many of you, fresh (or exhausted?) from your trip to Lyon eagerly turning over these pages to see if your Summary Minutes or a photograph of your Commission meeting has been included. Alas, you will have to wait at least two months until the next issue is published. The deadline for receiving material to be included in this issue was the end of July. Copy went to the publishers early August — well before Lyon. What we can include, however, are the Lyon Council reports. Most of these were received at the Secretariat in June or early July. In this issue we publish the reports of the President, Treasurer, Finance and Publication Committees. The Division Presidents' reports will appear in the next issue.

Prof. Giorgio Modena provides another example of this 'before and after effect'. At the time of going to press, Prof. Modena is President of the Organic Chemistry Division (III). However, by the time this issue arrives on your desk or in your post box he will have been succeeded by Prof. Joe Bunnet. Nevertheless, I hope that the short pen portrait of Prof. Modena on p. 6 will serve as a tribute to his many years of service to the Union.

We also include a feature article on the life and work of Niels Bohr. This is particularly appropriate since the centenary of his birth coincides with the publication of this issue — to the month. Some of you may be puzzled why a chemistry news magazine should publish an article by a physicist about a physicist. The answer is, as many chemists already know, that physics (at least much of it) is a branch of chemistry. Should there be any doubt about this just look at the work Bohr did on the physical and chemical properties of the elements, especially with respect to the periodic table of elements.

IUPAC wants you (to become an Affiliate)

Those of you who read my first editorial (in the previous issue of *CI*) will realize that I am not only Editor of *CI* but also, *inter alia*, Affiliate Affairs Secretary. I hope you will excuse me, therefore, if I draw your attention to the Affiliate Membership Scheme. We hope that all Titular and Associate Members of Commissions and Committees, indeed all chemists already involved in the work of IUPAC will support the Union by joining it as an Affiliate. You can only do this through your National Adhering Organization or National Chemical Society. If your NAO or Chemical Society has not yet decided to operate the scheme you can show your support of the Union by writing to your NAO or Chemical Society and reminding it of the benefits of Affiliate Membership. Please send me a copy of the letter. At the time of writing, 11 of the 45 NAOs have decided to operate the scheme. These are listed on p. 7. By the time you receive this issue, we hope more NAOs will have indicated their willingness to implement the scheme.

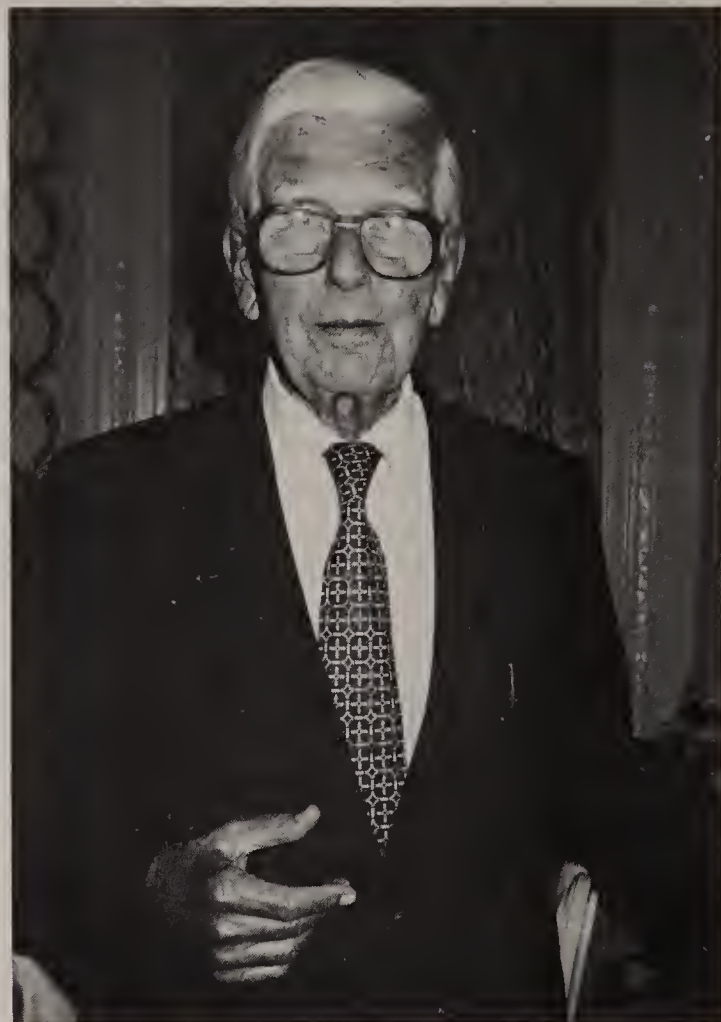
Scientists pay tribute to Herman Mark on his 90th birthday

Many famous scientists gathered together at a symposium in the New York Plaza Hotel in May this year to celebrate the 90th birthday of Prof. Herman Mark. They included Nobel Laureates Linus C. Pauling, Research Professor at Linus Pauling Institute of Science & Medicine, Palo Alto, California, Max F. Perutz of MRC Laboratory of Molecular Biology, Cambridge, Paul J. Flory, Emeritus Professor at Stanford University and R. Bruce Merrifield, John D. Rockefeller Jr. Professor at Rockefeller University. All four gave scientific presentations at the symposium.

In the initial part of the programme Prof. Clement Bamford from the Institute of Medical & Dental Bioengineering, University of Liverpool, presented greetings on behalf of IUPAC. He pointed out that Prof. Mark was Chairman of the Commission on Macromolecular Chemistry for the period 1947–57. The commission was created in London in 1946 to aid the regulation and standardization of the terminology and experimental methods in this new discipline. Members were appointed to the Commission in 1947. Prof. Mark was thus its first Chairman. During this period the Commission on Macromolecular Chemistry came under the Physical Chemistry Division. It was not until the Prague General Assembly in 1967 that the Macromolecular Division was formed. Prof. Mark was succeeded as Chairman in 1957 by Prof. H. W. Melville, and himself became a National Representative on the Commission until 1961.

Prof. Mark was born in Vienna, Austria on 3rd May, 1895. Over the past 70 years he has played a leading role in the field of polymer science and is often referred to as the 'Father of polymer science in the USA'. He continues to be active and is a frequent lecturer at symposia and seminars throughout the world. He has published over 500 papers and review articles and more than 20 books on various polymer science topics. He founded the *Journal of polymer science* and also organized the series on high polymers entitled *Encyclopaedia of polymer science and technology*.

At the Polytechnic Institute of Brooklyn, (now known as the Polytechnic Institute of New York), he established the unique and internationally famous Polymer Research Institute. He also started the first programme leading to a degree in polymer science and was instrumental in founding the Weizman Institute of Science,



Prof. Herman Mark at the New York Plaza.

initially organized at the Polytechnic Institute of Brooklyn.

Herman Mark received his PhD in 1921 in organic chemistry at the University of Vienna. He then went to the Institute of Fiber Chemistry of the Kaiser Wilhelm Institute in Berlin-Dahlem. In this period, he accomplished some of his most important work on the structure of cellulose by X-ray diffraction studies. In 1927, he joined the BASF in Ludwigshafen as a research chemist and rose to the position of Assistant Research Director. He was appointed Professor and Director of the Physical-Chemical Institute of the University of Vienna in 1932 and joined the International Paper Company in 1938 and the Polytechnic Institute of Brooklyn in 1940. He served at the Polytechnic Institute of Brooklyn on the faculty until 1965, eventually becoming Dean of Science.

In recognition of his achievements he has received 20 honorary doctoral degrees, 45 membership and honorary memberships of academies and professional societies, 40 medals and awards, including the national medal of science and now the Golden Cross with the Star of the Republic of Austria.

Glynn Michael retires

On 30th June this year, T.H. Glynn Michael retired as Executive Director of The Chemical Institute of Canada. At the same time, he retired as Secretary of the Canadian National Committee for IUPAC. His successor, who will occupy both positions, is Mr Hubert E. Drouin.

T.H. Glynn Michael has played a prominent role in IUPAC, not only on the Canadian National Committee but also on the Committee on Publications and the Committee for Chemical Research Applied to World Needs: The World Conference on Future Sources of Organic Raw Materials (CHEMRAWN I). Mr Michael has also served as The Chemical Institute of Canada's representative on the Canadian Commission for UNESCO. He was with the Institute for 28 years and during the same period also managing editor of what is now *Canadian Chemical News/L'Actualité Chimique Canadienne*.



Mr T. H. Glynn Michael.



Prof. Assen Zlatarov.

Centenary of the birth of Assen Zlataroff

The centenary of the birth of the Bulgarian scientist Assen Zlataroff (1885–1936) is being celebrated in Bulgaria this year. Assen Zlataroff was Professor of Organic Chemistry at Sofia University. His research covered many topics in analytical and biochemistry. For example, he published many papers on the biochemistry of cancer, enzymes and the influence of metal ions on fermentation. He edited the first Bulgarian chemistry magazine, *Chemistry and Industry*, and from 1928 to his death was life chairman of the League of Bulgarian Chemists.

CHEMRAWN IV postponed to March 1986

The fourth Chemical Research Applied to World Needs (CHEMRAWN IV) conference has been postponed for six months. CHEMRAWN IV is entitled 'The Global Ocean, Its Chemistry & Resources' (see *CI*, No. 4, pp. 23–25, 1985). The conference is jointly sponsored by IUPAC, the American Chemical Society, the Scientific Committee on Oceanic Research, and the Year of the Ocean.

The conference organizers have postponed the conference because they considered that some elements of the conference would not receive the attention in planning they deserved. They considered that the spirit and vision of the meeting were not developing at the same pace as the technical programme. Furthermore, funding support, although increasing, was slower than anticipated. By providing an additional six months, greater emphasis on the ideals of CHEMRAWN can be combined with the emerging strong scientific technological and economic elements of the programme.

The conference, which was to have been held from 23–27 September this year, will now be held at Woods Hole, Massachusetts, USA during 24–29 March 1986.

Prof. Tom West

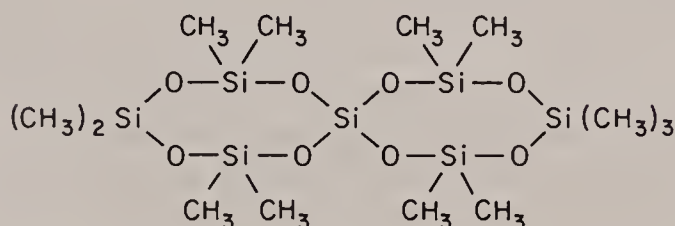
On 18th June this year the General Assembly of the Fondation de la Maison de la Chimie elected Prof. Tom West, Secretary General of IUPAC, to its Governing Council. The Fondation de la Maison de la Chimie was set up in 1927 and currently accommodates a certain number of French institutions concerned with chemistry (see *CI*, 1984, No. 3, pp. 14–16 and 1985, No. 2, p. 15). These include le Comité National Français de la Chimie (The French National Adhering Organization of IUPAC), la Fédération des Sociétés de Chimie, la Société de Chimie Industrielle and le Centre National de l'Information Chimique. The Governing Council of the Fondation has several foreign members in order to maintain international links.



Prof. T. S. West.

IUPAC creature identified

The following creature was spotted paddling through the pages of a recent IUPAC publication,



It has now been identified and reports suggest that it is slightly sick. For further information, refer to p. 36.

Secretary General's new telephone number

Prof. T.S. West, Secretary General, now has a new telephone number:
+ 44 (224) 318611

Prof. Norman Sheppard

In January this year, Prof. Norman Sheppard succeeded Prof. Victor Gold as Chairman of the British National Committee for Chemistry. Norman Sheppard, who is Professor at the School of Chemical Sciences, University of East Anglia, was President of the Physical Chemistry Division from 1979–83 and formerly Chairman of the Commission on Molecular Structure and Spectroscopy (I.5).



Prof. Norman Sheppard.

Prof. Sheppard also receives the Meggers Award this year. He is to receive it jointly with J. Erkelens for their article "Vibrational Spectra of Species Adsorbed on Surfaces: Forms of Vibration and Selection Rules for Regular Arrays of Adsorbed Species". The award is made by the Society of Applied Spectroscopy and will be presented at the twelfth annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies which is to be held in Philadelphia, USA, 20 September–4 October this year.

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The Ronald Belcher Memorial Award

The Publisher of *Talanta* is instituting a Ronald Belcher Memorial Award in commemoration of the late Prof. Belcher's outstanding contributions to analytical chemistry, international relations and understanding, his interest in student welfare, and continued association with *Talanta* from his conception of the journal in 1957 right up to his death.



Prof. Ronald Belcher.

Prof. Belcher, who died on 29th June 1982, was a loyal servant of IUPAC. He was President of the Analytical Chemistry Division Committee (1957–61) and served on the Analytical Chemistry Division Committee (1955–57, 1967–71), Commission on Analytical Reactions & Reagents (1951–59, 1968–77, 1979–82), Commission on Microchemical Techniques (1955–59) and the Commission on Analytical Nomenclature (1963–69).

The award will take the form of a travel grant of US-\$1000 to enable a young analytical scientist to undertake travel abroad and will be made in alternate years, starting in 1986. Candidates may be of either sex and any nationality, but must be under 30 years of age at the time of application. Applications may be sent by the

candidates themselves, or on their behalf by a responsible senior (for example, Head of Department, research supervisor), and must be submitted by the end of the year preceding the award. They must include a brief curriculum vitae, a short statement of the purpose of travel and the places to be visited, a testimonial of ability, and a recommendation from a senior research worker.

Applications for the first award, in 1986, should be sent to either

Dr R.A. Chalmers,
Department of Chemistry,
University of Aberdeen,
Old Aberdeen, Scotland

or

Professor J.D. Winefordner,
Department of Chemistry,
University of Florida,
Gainesville, Florida 32611, USA

to arrive before 31 December 1985.

Award for pesticide research

Following the 4th International Congress of Pesticide Chemistry which was held in Zürich, Switzerland, in 1978, an international award was established by the Swiss Society of Chemical Industries (SSCI) to recognize new outstanding innovatory contributions to research in one of the following fields of pesticide chemistry:

Discovery or development of novel active ingredients, which are of low hazard to the environment and can be used in practice.

Application of natural products in plant protection.

Synthesis of pesticides.

Structure–activity correlations of pesticides.

Biochemistry and mode of action of pesticides.

Metabolism of pesticides.

Residue analysis of pesticides.

Formulation of pesticides.

The first award consisted of 15 000.- Swiss francs and was presented at the 5th International Congress of Pesticide Chemistry held in Kyoto, Japan, in August 1982. The second award will be presented at the 6th International Congress of Pesticide Chemistry to be held in Ottawa, Canada, in August 1986. It will be made to an individual, without regard to age, sex and nationality, for an outstanding and significant piece of research in pesticides since the 5th International Congress of pesticide chemistry.

Application forms and further information can be obtained upon request from Dr U. Schwieter, Chairman, Awards Committee, F. Hoffman-La Roche & Co, S.A. CH-4002 Basle, Switzerland.

DIVISION PRESIDENTS

Prof. Giorgio Modena

Organic Chemistry Division (III)

Giorgio Modena was born in Ancona, Italy, in 1924 and studied at the University of Bologna obtaining the degree of 'Dottore in Chimica Industriale' in 1947. He carried on with research work at the University and obtained his first teaching appointment there. In 1963, he was appointed to the Chair of Organic Chemistry at the University of Bari and then, in 1967, moved to the University of Padova where he is Professor of Organic Chemistry.

Prof. Modena's scientific research activities have been mainly concerned with the study of organic reaction mechanisms. In 1956, during a postdoctoral research fellowship at University College, London, he started work with Dr A.D. Allen, under the supervision of Prof. E.D. Hughes, on nucleophilic substitution of silicon. At that time Prof. Sir Christopher Ingold was Head of the Chemistry Department.

Since then, his contributions to chemistry have been wide and varied. His work on the chemistry of sulphenyl-halides led to the synthesis of the first thiirenium ions. He has also worked on vinyl cation chemistry and, in particular, nucleophilic substitution on vinylic carbon. Other long-term interests have been oxidation and peroxide chemistry, the chemistry of sulphur-organic compounds and the protonation behaviour of weak bases in strong acids.

He has twice been a visiting Professor for a semester in the United States, once at Brown University, Providence, R.I. in 1969 and the other time at Texas Technical University, Lubbock, in 1980. In 1978 he was also a visiting Professor for two months at the University of Alberta, Edmonton, Canada.

Prof. Modena has been active as an organiser of and participant at several international congresses. He has also been particularly active in the Italian Chemical Society (SCI) of which he has been a member since the forties. He was its Vice-President (1977-79) and, at present, is a Member of the Consiglio Centrale of SCI. He has also served (1981-85) as Chairman of the Chemical Science Committee of the Italian National Research Council (CNR, Rome). In addition, he is a member of the National Academy of Science, Rome (Accademia dei XL) and Correspondent Member of the Istituto Veneto di Science, Lettere ed Arti.

In 1975, Prof. Modena was elected Titular Member of the Organic Chemistry Division



Prof. G. Modena, Division III President.

Committee. He served as Secretary of the Committee (1979-81), Vice-President (1981-83) and, from 1983 until this year, was President of the Division. His successor as President is Prof. J.F. Bunnett.

IUPACRONYM furore

Hurried consultations took place at the IUPAC Secretariat recently following a suggestion (see *CI*, No. 4, p. 1, 1985) that the word IUPACRONYM might become adopted into international nomenclature. The confusion arose since international organizations such as IUPAC and ICSU make frequent use of both acronyms and abbreviations. The problem was whether internationally recognized abbreviations could become IUPACRONYMS. One observer suggested that IUPAC and ICSU were themselves not acronyms but merely abbreviations - just like DDT and TV. This claim was quickly refuted by the IUPAC Information Officer, Michael Freemantle, who pointed out that an acronym is a word formed from the initial letters of other words whereas an abbreviation is a shortened version of one or more words. An acronym is thus an abbreviation whereas an abbreviation is not necessarily an acronym. Anybody puzzled by the logic of this statement, he added, should ponder the following 'a cat is an animal but an animal is not necessarily a cat'.

Affiliate Membership Scheme gathers momentum

Plans are now well advanced to start operating the IUPAC Affiliate Membership Scheme in January 1986. Eleven NAOs have already decided to implement the scheme. Affiliate Membership is also being offered to young chemists in Developing Countries. It is hoped that, where possible, existing and past members of IUPAC Commissions, Committees and Working Groups will support the Union by becoming Affiliates.

All the National Adhering Organizations (NAOs) of IUPAC have now been invited to operate the Affiliate Membership Scheme (see *C/*, No. 4, pp. 6–7, 1985, and references therein). At the time of writing the following countries have agreed to operate the scheme

Argentina	New Zealand
Canada	Sweden
Denmark	Switzerland
France	UK
Federal Republic of Germany	USA
Japan	

Czechoslovakia has also made enquiries.

Plans to implement and operate the scheme in these countries are already well advanced. Some countries are operating the scheme through the membership organizations of their Chemical Societies or Institutes of Chemistry. Their membership renewal papers for 1986 will include a letter from Prof. T.S. West, the Secretary General of IUPAC, inviting chemists to

become Affiliates of IUPAC. The letter explains what IUPAC is and describes the benefits of Affiliate Membership. The letter has been printed in the form of a blue leaflet.

As part of the IUPAC Affiliate Membership Scheme, IUPAC is also offering full Affiliate Membership in 1986 to a limited number of young chemists in Developing Countries for a nominal membership fee of US-\$1.00. This is possible as a result of grants from the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Council of Scientific Unions (ICSU). IUPAC Affiliates nominated in this way will receive *C/* in 1986 and also have the opportunity of enjoying all the benefits of Affiliate Membership described by the Secretary General in his letter. It is hoped that, by accepting these invitations, young chemists in developing countries will not only become more aware of IUPAC but also become involved, in one way or another, in its activities.

Open letter to all IUPAC Committee and Commission Members

Dear Colleague,

If you have been reading *Chemistry International* recently you will be aware that the Union intends to introduce a Scheme of Affiliate Membership whereby chemists can, through their National Chemical Societies or Academies of Science, become Affiliate members of IUPAC. They will, *via* regular receipt of six copies of *Chemistry International* per year, be kept up to date with what is going on in IUPAC, what is planned for the future, news of tentative nomenclature for comment, recent reports, accounts of IUPAC symposia, etc. The Affiliates will also be visible as potential future recruits to Commissions and other committees of the Union and will be entitled to several other benefits, including concessionary purchase of IUPAC publications. I will not discuss the Scheme further here because many of you will shortly be receiving details *via* your Chemical Societies. [As I write this in July, 11 of the 44

NAOs have already agreed to operate the scheme.] In case you have not heard of the scheme in your country, however, may I refer you to *C/* Vol. 5, No. 4, pp. 17–20 (1983) where most of the details are given.

So, the Union will shortly recruit Affiliates in several of its 44 member countries in 1986; others have indicated they will start recruiting in 1987. If, as I suspect, you are already a member of a Commission or other IUPAC body, you receive *C/* regularly and you are already active in IUPAC. However, we hope that you, as a IUPAC person, will also join as an Affiliate, particularly at the beginning when we need your support visibly to get the Scheme off the ground in 1986. Your joining will demonstrate to other chemists your support and belief in the objectives of the International Union of Pure and Applied Chemistry. In addition, there will even be financial incentives for you as an Affiliate that will not

be available to you as a Titular or Associate member.

If you have served your maximum allowed time on IUPAC bodies and are about to leave the Union in 1985 please consider keeping contact with us by becoming an Affiliate through your Chemical Society and thus learning regularly what is going on in IUPAC. We need your continued support. Affiliate membership will provide a new channel for you to continue to have an influence in IUPAC's affairs.

Either as a continuing or retiring member of an IUPAC body, the Union needs your support *now* for this exciting new venture of allowing the world's chemists to become affiliate members.



There must be well over a million chemists in the world yet only 1500 are allowed to be active in IUPAC. One of our recent Past Presidents, Heini Zollinger of Switzerland, said IUPAC was thought by many chemists to be an exclusive club or charmed circle.

However, with his help and also that of his predecessor Georges Smets of Belgium, and successors Saburo Nagakura of Japan, Bill Schneider of Canada and President Elect 'Ram' Rao of India, IUPAC has dared to make what my own predecessor, Guy Ourisson of France, described as the most unusual experiment of a *corporate* body daring to admit Affiliate members. But it is after all in the age-old tradition of chemistry to make experiments.

So please support your International Union at this critical time when it would be most helpful by joining as an Affiliate yourself and encouraging your non-IUPAC colleagues also to join. If

you have not heard about the details of the Scheme in your country please write to the Secretary or President of your National Chemical Society to enquire when this facility will be available in your country, with a copy of the letter sent to Dr Mike Freemantle, our Affiliate Affairs Secretary at the Oxford Secretariat.

Astronomers do it!

There are, I am sure you will agree, very few astronomers in the world compared to chemists. The International Astronomical Union (IAU) has operated a scheme of membership for many years and it now has over 5000 members world-wide. Indeed any Astronomer of international repute more or less has to be a member of IAU to denote his, or her, standing. We hope that soon all the best chemists will become Affiliates of their International Union.

How much does it cost?

IUPAC is asking participating Adhering Organizations or their nominated Chemical Societies to collect the equivalent of US-\$7.50 for 1986 plus whatever additional handling charge is necessary for its own costs. Thus the cost will vary from one country to another but it will most probably be of the order of US-\$7.50 (equivalent). Details will be worked out by each participating Chemical Society.

UNESCO-ICSU aid for Affiliates in Developing Countries

Between them UNESCO-ICSU have contributed US-\$15 000 to allow us to establish heavily subsidised Affiliate memberships (costing only US-\$1.00 each) for about 500 chemists in developing countries for two years — including many countries that are not national members of IUPAC. We are, therefore, offering our chemist colleagues in these countries a facility to join the wider community of chemists which was completely unavailable to them hitherto. Each of you who joins the Scheme voluntarily from a developed country will, by virtue of your support, better enable us to have a chance to continue such an activity in developing countries once the UNESCO-ICSU subvention has ended in 1987.

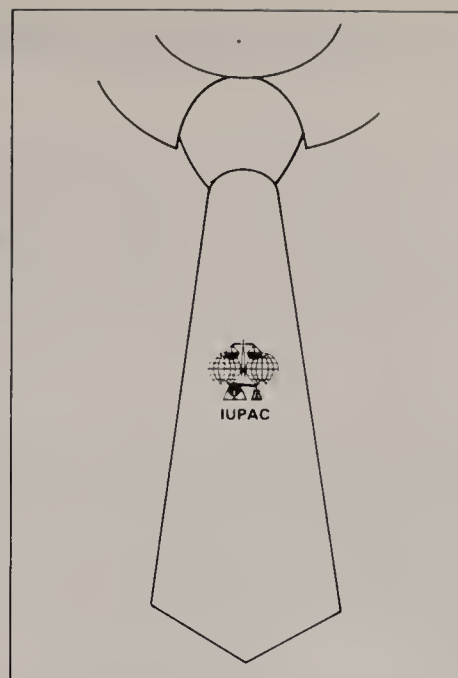
Fly the IUPAC Flag

Whilst on the subject of supporting the Union by becoming an Affiliate and urging your colleagues also to join, can I suggest that you should consider purchasing one of the rather elegant and distinctive Navy Blue or Maroon IUPAC neckties. They attract a considerable amount of attention and are very popular with

those who have bought them. They cost US-\$10.00 including postage and packing, and are available from the Secretariat Office. I hope you will seriously consider visibly supporting the Union in this way on all 'chemical' and other scientific occasions. Given encouragement I am sure we can also rise to a similar scarf for IUPAC lady members or wives. Once more, please help us raise the visibility of IUPAC not only for the world's chemists, but also in the eyes of other scientists.

As the rather fierce looking gentleman on the left says "IUPAC wants you". Don't let us down, join as an Affiliate *and* fly the flag by buying and wearing the IUPAC tie.

Yours sincerely, **T.S. West** Secretary General



Spectrochemical and Other Optical Procedures for Analysis

In this report the work of the Commission on Spectrochemical and other Optical Procedures for Analysis (V.4) is reviewed by the Secretary of the Commission, Dr L. R. P. Butler

Commission V.4 was started by a group of enthusiastic spectrochemists in the years soon after the war. It was obvious that analytical chemistry had developed considerably with the emergence of analytical instruments utilizing such physical phenomena as spectral atomic emission from flames, arcs and sparks; molecular absorption; X-ray fluorescence and diffraction. All these techniques were considered to be spectrochemical, although in later years spectrochemistry has been considered to be a part of the broader field of analytical spectroscopy.

It was evident from the early days that there was an urgent need for uniformity in terminology and for unambiguous definitions of units and symbols. This need continues as new methods and instruments are developed. The work of IUPAC is highly regarded and Commission V.4 has made significant contributions to establishing a sound structure of nomenclature which is generally used by scientists throughout the world.

Spectrochemical methods, especially those applied to metal analysis, became extremely popular during the war years when high-speed analyses with high power of detection were required for war materials. The rapid advance of electronics led to photoelectric detection enabling quantitative analyses to be carried out in minutes instead of hours. Many important developments have taken place over the years so that spectrochemical methods are the cornerstone for most industrial, environmental, agriculture, medical and other laboratories.

Narrative form

It was decided at the outset that by using a narrative form for documentation, not only would terms be described but their usage in text could be noted. The early and later members of the Commission realized that rigid definitions should only be made when



Dr L. R. P. Butler, Secretary, Commission V.4.

there is no doubt about the terms, units or symbols. Consequently great care was and is taken to make cross-references to other definitions — when these are available, for example, those of SI and other ICSU Commissions.

One of the problems with the narrative style, however, is that the text may tend to become tutorial. This is carefully avoided in all the documents as the intention is not to compete with text books. Another disadvantage occurs with usage in other languages. For the documents to have the

same impact, the full text must be translated — an onerous and time-consuming task.

Procedure for preparing a document

The first step in document preparation is to assemble a word list. The word list is circulated and after all Commission members have contributed, the first draft of the document in narrative style is drawn up by the project team. After several processes of circulation among members and external experts, and correction, the final drafts of the document are prepared. The average time taken to prepare for the final document is 2 to 4 years. All documents have indexes together with a composite index which is continually updated as new documents are completed.

Parts completed to date are:

Part I: General Atomic Emission Spectroscopy, PAC, Vol. 30, p. 653 (1972). This document deals briefly with quantities relating to radiant energy, analytical procedures and certain *general* terms used in emission spectroscopy including excitation sources and photographic detection. This document will probably be updated soon.

Part II: Data Interpretation, PAC, Vol. 45, p. 99 (1976). This short part defines the terms related to the calculation of results and their interpretation, for example, definitions relating to statistical assessments, sensitivity and power of detection.

Part III: Analytical Flame Spectroscopy and Associated Non-Flame Procedures, PAC, Vol. 45, p. 105 (1976). This is a major work where terms, symbols and units relating to flame emission, absorption and fluorescence spectroscopy are described and defined.

Part IV: X-Ray Emission Spectroscopy, PAC, Vol. 52, p. 2541 (1980). The first X-ray document clarifies terminology relating to X-ray analysis. Reference is made to sampling as applied to X-ray analysis, X-ray generation, measurement, and data interpretation.

Part V: Radiation Sources: This provisional document was published in PAC, Vol. 53, p. 1913 (1981). The final document is in press. Radiation sources used in emission and absorption spectrochemistry (excluding X-ray and molecular spectroscopy) are described. This document has taken some time to complete because of the rapid development of such sources as inductively coupled plasmas resulting in changes in nomenclature. It covers electrical arcs, sparks, low-pressure electrical discharges in gas, plasma sources, and such. Terms relating to processes such as volatilization, atomization, spectral lines and radiation processes are defined.

Part VI: Molecular Luminescence Spectroscopy: The provisional document was published in PAC, Vol. 53, p. 1953 (1981). The final document is in press. Terms relating to luminescence, analytical parameters, instruments and factors affecting luminescence data are described and defined. This document was critically studied by several other Commissions as well as experts throughout the world. It relates to Part VII — molecular absorption spectroscopy.

Parts in preparation and ready for final acceptance:

Part VII: Molecular Absorption Spectroscopy (Ultra-violet and visible). In its final form this document deals with fundamental principles of absorption spectroscopy as well as such practical concepts as instruments, measuring techniques and results.

Part VIII: Nomenclature System for X-Ray Emission Spectroscopy. This document is in its final form and proposes a new system of notation for X-ray emission lines and absorption edges — to be called the IUPAC notation. Mainly replacing the Sieghahn Roman numerals by Arabic numbers and designating absorption edges clearly, it removes certain discrepancies experienced by X-ray spectroscopists and analysts.

Part IX: Dispersion and Isolation of Radiation. It has long been felt that a uniform nomenclature is necessary in describing instruments and devices for dispersing, isolating and selecting parts of the electromagnetic spectrum. This part is also ready for final publication and should be finally approved in Lyon.

Part X: Preparation of Materials for Analytical Atomic Spectroscopy and Other Related Techniques. Sampling for spectrochemical and other modern instrumental analytical techniques often requires a special approach. Nomenclature has often been vague and this document, prepared in close consultation with other commissions, clarifies certain terms.

Parts in preparation nearing completion:

Part XI: Radiation Detectors. Detecting and measuring radiation is a vital part of analytical instrumentation. The wavelength range of the radiation as well as the fields of application has required that radiation detectors be classified into various categories. Each category is being dealt with separately by different experts in the team but the document will be published as a whole.

Part XII: Electrothermal and Hydride Methods of Analysis. These techniques have emerged mainly in relation to atomic absorption spectroscopy. It was realized that, although Part III deals with certain aspects of nomenclature, developments have been so rapid that many new terms have emerged, thus requiring a separate document.

Part XIII: Atomic Fluorescence Spectroscopy. As with Part XII, atomic fluorescence spectroscopy has emerged as a useful analytical technique. It was decided that it should be treated separately from the flame techniques covered in Part III. It is still in the word list stage.

Other subjects which are on the project lists are
measurement and data processing of spectra
laser spectroscopy
photo-acoustic spectroscopy
auger electron spectroscopy
coherent forward scattering spectroscopy.

Anyone interested in the projects above or who feel that he/she could make a contribution, is invited to write to the Chairman or Secretary.

Niels Bohr: a sketch of his life and work

by Jørgen Kalckar

This year marks the centenary of the birth of the Danish physicist Niels Henrik David Bohr. In this article, Jørgen Kalckar*, a Danish physicist who worked with Niels Bohr, reviews the development of the pioneering work of Bohr and a narrow circle of pupils and collaborators which laid the foundations of modern quantum theory.

The early years

Niels Bohr was born on 7 October 1885 in Copenhagen. His father, Christian Bohr, was a physiologist of international reputation, an original and highly gifted scientist with a deep interest in general philosophical questions and a broad-minded political outlook. In 1881 he married the beautiful and gentle young student, Ellen Adler, and together they created a home which became distinguished by its intellectually stimulating atmosphere as well as by its open and tolerant human attitudes, and which offered Niels and his younger brother Harald (who became one of the leading mathematicians of his time) the best possible conditions for growing and maturing harmoniously.¹

"He is showing himself more and more exceptional. But at the same time he is the kindest, most modest young person you can imagine."

The unique talents of the young Niels Bohr were clearly perceptible from his early boyhood. His father considered him the thinker of the family, and the recollections of schoolmates and fellow students at the university testify to the strong impression left by the young genius in the memory of everyone who met him. In 1903, he began his physics studies at the University of Copenhagen, and in 1904 Helga Lund, one of Bohr's student friends (she later became a well-known school headmistress), wrote in a letter to a relative:

Apropos genius. It is wonderful to know a genius and I do, and I am even with him every day. His name is Niels Bohr and I have told you about him before. He is showing himself more and more exceptional. But at the same time he is the kindest, most modest young person you can imagine.²

In 1907, the gold medal of the Royal Danish Academy of Sciences and Letters was awarded to Bohr for an essay on the determination of the



Niels Bohr in the early twenties.

surface tension of liquids; this is the only experimental work we have from Bohr's hand.

Early in his studies, his interest was drawn to the phenomenon of radioactivity. The following lines, quoted from a manuscript for a student seminar given by Bohr in 1905, serve to show already how deeply immersed he was in the world of atoms, and the amazing maturity and mastery with which he from the very beginning grasped the essential points of its novel and unfamiliar features:

That there is any meaning at all in speaking of an average lifetime without indicating a definite time for the starting-point lies in the fact that atoms, as it were, do not grow older before they disintegrate, so that the chance of decay is the same at every instant of their lifetime.³

In 1911, Bohr obtained his Doctor's degree with a thesis on the electron theory of metals, and the year after he became engaged to Margrethe Nørlund. They married on 1 August 1912 and from the very beginning Margrethe Bohr became an indispensable, devoted and understanding support to her husband. To her Bohr ascribed the merit of bringing

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up the children, describing his own contribution as having added a remark or two in reading the proofs. However that may be, throughout a long and strenuous life Margrethe and Niels Bohr together created a home that provided the setting for a harmonious, relaxed and joyful family life, a life which hospitably took in a large and ever-growing circle of friends and visitors, and from which Niels Bohr day after day drew new strength and inspiration.

Two years from 1911 to 1913 are the immensely fruitful years of the great breakthrough. Bohr studied with J. J. Thompson in Cambridge and Rutherford in Manchester, and the new ideas ripened in his mind. The year 1913 was one of fulfilment and a new beginning. The theory of atomic constitution was published and Bohr was no longer a young scientist engaged in solitary studies, but the leader of a new movement in physics.

“one could not afford the luxury of one-sidedness”

A serious dilemma

In Niels Bohr's pioneering work on atomic constitution, two main lines of development in European physics met for the first time. One line was derived from the study of the thermodynamic properties of electromagnetic radiation — a field to which important contributions were made by Boltzmann, Wien, Planck and Einstein. The second line originated from the experimental investigation of radioactivity

and atomic structure by the Curies in France and especially by Rutherford and his group in Manchester. Curiously enough, in the beginning, very little interaction took place between the two currents. Scientific communication across national frontiers was then, at the beginning of the twentieth century, considerably slower than today, and so for some time the nuclear atom remained a British speciality, whereas the quantum of action stayed a local German concern. Niels Bohr often said how much it had meant to his own work that he grew up in a small country where one could not afford the luxury of one-sidedness and where, therefore, a meeting took place between the two hitherto separated main lines.

Max Planck's discovery, in 1900, of the universal quantum of action was to prove the beginning of a new era in the natural sciences. However, Planck himself very carefully avoided drawing any far-reaching conclusions from his discovery — that in thermal equilibrium between matter and electromagnetic radiation, energy can only be exchanged between the surroundings and the individual modes of vibration into which radiation can be resolved in finite portions, each being integral multiples of $h\nu$, where ν denotes the frequency of the mode considered and h the universal unit of action. That one was indeed facing a new unsuspected element of atomicity in the concept of energy was especially made clear through Einstein's analysis, in 1905, of the photoelectric effect. Einstein showed that, in the case of monochromatic incident radiation of frequency ν , the intensity and energy distribution of the electrons liberated by the radiation (which was



Bohr and Rutherford at the Cambridge regatta, 1923.

inexplicable on the basis of ordinary wave theory) could be simply accounted for on the assumption that electromagnetic radiation in its interaction with matter behaved like a gas of corpuscles — photons. Each photon carries a single energy quantum $h\nu$, which could only be absorbed in its entirety by the electrons in the metal.

In spite of the decisive progress thus achieved, a serious dilemma remained inasmuch as the familiar interference effects characteristic of electromagnetic radiation remain incompatible with any corpuscular picture of radiation. As stressed by Bohr, the dilemma is sharpened by the recognition that in fact the very definition of the energy of individual light corpuscle rests on a determination of the frequency through analysis of interference patterns on the basis of wave theory. This so-called particle-wave dualism was later to prove a fundamental feature in the account of the behaviour of atomic particles, as it became especially conspicuous through the famous demonstration by Davidsson and Germer of interference patterns created by electrons passing through a crystal.

At the same period in which such fundamental new regularities were revealed, demonstrating the inability of classical physical theories to account for the interaction between radiation and matter, Rutherford and his group made a decisive step forward in their exploration of the structure of matter itself. The discovery, in 1911, of the atomic nucleus in which, in spite of its vanishingly small extension compared to the size of the atom, almost the entire atomic mass is concentrated, actually represented the first piece of solid experimental knowledge on which to base theoretical speculations with respect to atomic constitution. The Rutherford atomic model, in which a heavy, positively charged nucleus is surrounded by a cloud of negatively charged electrons in a number sufficient to form an electrically neutral atom, represented a no less radical departure from classical electromagnetic theory than Planck's and Einstein's ideas, since, according to Maxwell's theory, such a system would be unstable because of loss of energy through radiation, whereby the electrons (through a spiralling orbit) would coalesce very rapidly with the nucleus.

Epoch-making papers

As Bohr himself related in his Rutherford lecture,⁴ he was from the outset convinced that the quantum of action presented the clue to atomic problems. Such a view was also expressed elsewhere, but none of these attempts led to new insights. What made Bohr succeed? Was it his unique sense of logical coherence? Was it the combination of extreme boldness guided by a rare physical intuition and minute care in attending to every relevant detail? The workings of genius are inscrutable and, when all is said, one can only marvel at the confrontation between this unfailing sureness of grasp and the continuity and profoundness of inspiration that characterized Niels Bohr's life-work from beginning to end.



Einstein and Bohr in Brussels during the 1930 Solvay Congress.

In his epoch-making papers from 1913,⁵ the fundamental points of departure from classical electrodynamics are made explicit through two postulates. The first of these expresses the existence of certain stable configurations of electrons or so-called stationary states of the atom, where no radiation takes place. The second establishes the connection to Planck's and Einstein's work through the assumption that the electron, in passing from one stationary state to another, emits or absorbs radiation of a frequency given by the difference in energy of the two states divided by Planck's constant. As a preliminary tool, Newtonian mechanics was utilized for the description of the orbits of the electron in the stationary states — though of course the stability of these states as well as the mechanism of transition between them were clearly outside the scope of such a treatment.

In the simplest case of the hydrogen atom, Bohr was able to express the energy of each stationary state in terms of the elementary unit of charge, e , the mass of the electron, m , and Planck's constant, h . According to the second postulate, the frequencies of the radiation emitted or absorbed by the atom were given as a series of differences of the mentioned energies divided by h . The line spectrum thus obtained exhibits a perfect agreement with the empirical regularities which Rydberg and Balmer had found to hold for the frequencies of atomic spectra. In the following years, Bohr extended his

analysis to spectra of other elements, including the Zeeman and Stark effects which consist in the splitting of the spectral lines when the sample emitting the radiation is placed in a magnetic or an electric field, respectively. In all cases, a qualitative understanding was obtained, although the agreement in general was not complete, as in the case of the simple hydrogen spectrum.

The scope and importance of Niels Bohr's work now became increasingly evident in circles well beyond his own. In 1916, when Bohr was only 31 years old, a chair was created for him at the University of Copenhagen, and he became professor of theoretical physics. Five years later, in 1921, the institute now carrying Niels Bohr's name was inaugurated, and from then on physicists from all over the world met at Blegdamsvej to participate in the activities. A most important aspect of Bohr's work was the essential clarification presented, around this time, of the laws governing the physical and chemical properties of the elements.

Nobel Prize

On the basis of empirical chemical knowledge, Mendeleev had in the nineteenth century developed the so-called periodic table in which the elements are ordered according to increasing atomic weight. The remarkable feature of this table is the periodic variation of physical and chemical properties. The periodicity is so well defined that Mendeleev was able to direct the attention to certain missing elements associated with gaps in the table.

“Bohr's results had a largely intuitive basis”

From the very outset, Bohr realized that, while the explanation of radioactive processes had to be sought in the intrinsic constitution of the nucleus, the ordinary physical and chemical properties of the elements manifested properties of the surrounding electron system. Owing to the large mass of the nucleus and its small extension, compared with that of the entire atom, the constitution of the electron system would depend almost exclusively on the total electric charge of the nucleus. Through conversations with Hevesy, Bohr had early become convinced that the so-called atomic number, describing an element's position in Mendeleev's table, was to be identified with the nuclear charge, expressed as a multiple of the elementary unit of electricity.⁶ Thus Bohr anticipated that the physical and chemical properties of an element are uniquely characterized by the atomic number. Leaning on the rapidly accumulating spectroscopic evidence — particular mention should be made of Moseley's striking pictures of X-ray spectra — and the many important theoretical contributions by Sommerfeld and others (who further developed Bohr's original atomic model), Bohr proceeded step by step towards a detailed understanding of the atomic basis for the physical and chemical properties of the elements. In particular, the periodicity features in Mendeleev's table were associated with a characteristic shell

structure in the electronic configuration of the atom. Of course, Bohr's results had a largely intuitive basis inasmuch as such an important feature as Pauli's exclusion principle was still unknown.⁷

Bohr's application of this theory to the prediction of the properties of the yet undiscovered element 72 was to play a special role. In this case, conclusions based on the systematics of empirical periodicity were ambiguous. Nevertheless, the general belief was that the element would share the properties of the so-called rare earths which are its immediate predecessors in the periodic table.

According to Bohr's model, the series of rare earths must terminate with element 71, and therefore the shell structure of element 72 is quite different, namely, similar to element 40 (zirconium). The immediate conclusion was that it was futile to search for the missing element in samples of rare-earth metals; instead, if Bohr were right, it was expected to occur in minerals containing zirconium. The investigation was undertaken in 1922 by Coster and Hevesy in Copenhagen, and the critical point was reached just after Bohr had left Copenhagen to accept the Nobel Prize in Stockholm. A few days later, when delivering his Nobel lecture, Bohr was able to inform his audience that he had received a message from Hevesy and Coster announcing the discovery of element 72 in zirconium minerals. Hevesy and Coster named the new element 'hafnium' after Hafnia, the Latin name for the city of Copenhagen.

The ensuing decade is remembered by those who took part in the work as the golden age of quantum mechanics. Hardly ever before had there been seen in one place so many gifted young people as those who now gathered round Bohr at the Institute in Copenhagen: Klein, Kramers and Heisenberg together with Pauli, Ehrenfest, Gamow, Bloch, Casimir, Landau, Weisskopf and many others. In a book dedicated to the commemoration of Niels Bohr,⁸ some of these have related their memories of the epoch when the new science of the structure of matter was created in an atmosphere of humour, enthusiasm, lively discussion and hard work. It was in these years that Bohr developed to the full his very personal style — the *Kopenhagener Geist*, as it has been called by some of his pupils — the style which left such a deep impression on the entire science of atomic physics.

The correspondence principle

In spite of the impressive success of Bohr's theory in accounting for so many empirical regularities with respect to the structure of matter, the heuristic character of the description so far achieved was acutely felt — first and foremost by Bohr himself. The basis for the entire treatment by Bohr and his collaborators was the correspondence principle, which expresses a far-reaching structural similarity between quantal regularities and the laws of classical physics. In Bohr's hand, the correspondence principle became an immensely fruitful guide in the exploration and ordering of the realm of quantum phenomena. The question, however, as to whether



Bohr, Heisenberg and Pauli.

the correspondence principle should be considered a logical parallel to the quantum postulates, or whether it had to be assigned a different status, could of course be answered on the basis of a comprehensive quantal formalism, in which the quantum postulates as well as the correspondence principle were inherent parts. The development of such a formal scheme appeared in the early 1920s as a formidable task. Nevertheless, the problem was solved with remarkable speed through the intense collaboration of a whole generation of physicists.⁹

Heisenberg's establishment of the formalism of quantum mechanics, and its further development through contributions by Born, Dirac, Schrödinger and many others, not only gave physicists the proper tool for the systematic treatment of every aspect of atomic constitution, but also offered enough scope for the resolution of the apparent paradoxes connected with 'particle-wave dualism'. The key to the elucidation of the situation was presented by Heisenberg's uncertainty relations, which are an immediate consequence of quantal formalism, and which express a reciprocal limitation in the possibility for fixation of any pair of so-called 'conjugate' kinematic variables (e.g. a position coordinate and the corresponding component of momentum).

Through a penetrating analysis of the implicit conditions for definition and observation of classical physical concepts (as position or momentum) in the domain of quantum physics, Bohr was able to interpret the content of uncertainty relations and show how they express the impossibility of utilizing one and the same experimental arrangement for the fixation of variables, such as position and momentum of an atomic object. In this way, Bohr also

demonstrated how every paradox is excluded in the account of wave-like or particle-like attributes of such objects by pointing to the mutually exclusive character of the experimental arrangements with which the mentioned attributes could be observed and defined. It is in order to describe this situation that Bohr, for the first time in 1927, used the term 'complementarity', thereby referring to a type of description which leaves room for two mutually exclusive aspects of the total domain of experience.¹⁰

Dealing with quantum phenomena

In the idealized description of classical physics, the experimental arrangement does not enter explicitly at any point. This fact depends on the unlimited divisibility of any process within the classical framework, which renders the role of the measuring apparatus trivial. It is of course true that a determination of the position of a physical object ultimately rests on the establishment of a rigid connection to the heavy bodies defining the reference frame, whereas momentum measurement presupposes the test body to be free to move under the influence of a given force (e.g. arising from an appropriate spring arrangement). Still, this circumstance in no way excludes the simultaneous fixation of position and momentum of an object; the unlimited divisibility of any physical process, alluded to above, ensures the possibility of making the interaction between the object and the measuring apparatus arbitrarily weak or even taking the

influence of this interaction explicitly into account.

When dealing with quantum phenomena, where the existence of the quantum of action manifests itself through a novel feature of wholeness in the elementary processes, the situation is radically different. Any attempt at subdividing a quantum phenomenon requires a definite change in the experimental arrangement incompatible with the occurrence of the original phenomenon. Thus, if we consider a monochromatic beam of electrons originating from some source and passing through a given system of diaphragms fixed in space before the electrons are detected on a photographic plate, we are dealing with a closed process. In this process no information concerning the trajectory of the electrons can be extracted by observing the position of a single spot on the photographic plate left by the impact of an individual electron. Only the statistical distribution of spots can be a part of the description of the mentioned experimental set-up, and the interference pattern reflects the dimensions of the apparatus as well as the wavelength associated with the motion of the electron. A subdivision of the process, by which it becomes possible to answer the question of whether the electron passed through a given limited spatial region on its way towards the photographic plate, can be achieved only by changing the arrangement of diaphragms in a way that will definitely prevent the occurrence of the original pattern observed on the plate.

“Our way of thinking about man’s position in nature, which we observe and of which we ourselves at the same time remain a part, was irrevocably and radically changed through Niels Bohr’s work.”

The elaboration and refinement of this profound analysis, which continued to occupy Bohr to the end of his life, represents, in its depth and its highly characteristic fusion of intense personal intuition and immense logical power, a singular achievement in the history of natural science and philosophy.¹¹ The only parallel to which it may be compared is Einstein’s analysis of the conditions for unambiguous application of space-time concepts by which the foundation of the theory of relativity was laid. Our way of thinking about man’s position in nature, which we observe and of which we ourselves at the same time remain a part, was irrevocably and radically changed through Niels Bohr’s work.

A new and brilliant investigation

About the same time as this widening of the philosophical horizon took place, experimental exploration of the world of atoms had developed to such an extent that it became possible to study nuclear processes not only through natural radioactive transmutations, but more systematically and on a larger scale through reactions induced by collisions of artificially accelerated projectile nuclei with target nuclei. Although in many cases the process could adequately be accounted for by the



Niels Bohr in 1935.

methods of quantum mechanics applied to the projectile nucleus moving in an appropriately constructed potential, one often encountered characteristic resonance phenomena of a nature quite foreign to a simple potential model, especially when dealing with neutrons impinging on a target consisting of heavy nuclei.

In a new, brilliant investigation Bohr showed how this observation could be interpreted as evidence for the formation of a relatively long-lived intermediate state, the so-called compound nucleus. Owing to the close packing of a large number of nucleons (i.e. protons and neutrons) in a heavy nucleus, the kinetic energy of the projectile is immediately distributed among the nuclear constituents, and the successive decay of the unstable intermediate state can therefore be viewed as a competition between the various possible modes, amenable to a statistical treatment.¹²

Particularly impressive was the application of this model to the fission processes of the heaviest elements, discovered experimentally in 1938 by Hahn and Strassman. The process consists in the splitting of a heavy nucleus, like that of uranium, into two approximately equal parts, for instance when excited through neutron bombardment. Immediately after the discovery, Meitner and Frisch took an important step towards the interpretation of the phenomenon by pointing to the critical decrease in stability of nuclei of high charge as a consequence of the balancing of attractive nuclear forces and electrostatic repulsion. In 1939, Bohr, in collaboration with Wheeler, published a detailed investiga-

tion of the mechanism of fission.^{1,5} Whereas the previously considered decay modes of the compound nucleus could be compared to the evaporation of single molecules from a liquid drop, heated by the transfer of kinetic energy from the incident particle, the fission process corresponds to a splitting of the liquid drop resulting from oscillation of its shape.

Of special importance for subsequent developments were the arguments brought forward to show that uranium fission induced by slow neutrons could almost entirely be ascribed to the rare isotope U^{235} (the abundance of U^{235} relative to U^{238} is less than 1 per cent), which, together with the incident neutron, forms the unstable compound nucleus U^{236} . The role of U^{235} can be understood on the basis of the fact that the binding energy of a neutron in a nucleus such as U^{235} , having an odd number of neutrons, is considerably larger than it is in a nucleus like U^{238} , having an even number of neutrons. Thus, the compound nucleus formed by capture of a slow neutron in U^{235} is produced in a state of higher excitation than the compound nucleus formed by slow neutron capture in U^{238} .

The cause of peace

By a strange coincidence, the treatise containing the theory of nuclear fission was published in the *Physical Review* of 1 September 1939 — the day of

the outbreak of the Second World War. The possibility of liberating nuclear energy was realized by Bohr and others from the very beginning; however, it was thought that the enormous technical difficulties could not be overcome in the foreseeable future.

Beginning in the early 1930s, the darkening of the political horizon had also cast its shadow over international scientific collaboration. When the Nazi regime came to power in Germany, a stream of refugee scientists came to Copenhagen, where they obtained help from Bohr. Among those who stayed on for some time were James Franck, Hevesy, Placzek and Frisch. With the outbreak of the war and Denmark's occupation by the Germans in 1940, the lively contact between Bohr and his pupils and collaborators all over the world came temporarily to an end.

“Bohr, like many of the other great scientists involved, became increasingly alarmed by the political prospects augured by the construction of the atom bomb.”

In 1943, in order to escape capture by the Nazi occupiers, Bohr and his family had to flee from Denmark to Sweden. From there he reached England, where he became associated with the British Atomic Energy project and learned about develop-



Niels Bohr at his summer house in Tisvilde in the 1940s.

ments towards the creation of a weapon of terrible destructive power. Both in Great Britain and later, during his affiliation with the project in Los Alamos, Bohr, like many of the other great scientists involved, became increasingly alarmed by the political prospects augured by the construction of the atom bomb. Still, Bohr's attitude was markedly different from that of his eminent colleagues. Not that Bohr felt less horror in face of such an increase in man's destructive potential, but a deep and constructive optimism, which formed such an integral part of his creative personality, led him to concentrate on the unique chance inherent in the radically new situation.¹⁴

Time and time again, Niels Bohr tried to impress upon political leaders the urgency of common action to prevent disastrous use of the formidable powers which had come into the hands of man. He stressed forcefully that a common recognition of the critical predicament of civilization could, as never before, open up the way to a united, world-wide effort by the creation of an open world where disputes would no longer be settled by military means. In 1950 he put forward his views in an open letter to the United Nations, and to the end of his life he was deeply occupied with the best way of furthering the cause of peace.

"Extensive international cooperation, which is to such a large extent responsible for the rapid progress of science in modern times, was not least valued by Bohr as a means of overcoming individual, national or political prejudices."

For Bohr, science never stood apart from life. He saw scientific research as a highly developed expression of the common human urge to explore the world in which we live, and of which we ourselves are a part. In accordance with this view Bohr took a vivid interest in the social aspects of scientific activity, and the favourable position held by science in Danish society in the 1960s was attributable more to Niels Bohr's perspicacious influence than to any other individual effort. Extensive international cooperation, which is to such a large extent responsible for the rapid progress of science in modern times, was not least valued by Bohr as a means of overcoming individual, national or political prejudices. Among the international organizations to whose realization Niels Bohr contributed decisively is CERN, the great centre of European experimental physics.¹⁵ But first and foremost the international atmosphere at Niels Bohr's own institute, where also today physicists from East and West work together and become friends, represents his precious legacy to the younger generation.

A living symbol

The life and work of Niels Bohr are but two aspects of one destiny. Only this unique personality could have possibly achieved such a lifework. And this

accomplishment is the cornerstone of his life, which was so rich and so honestly devoted to the service of truth. The powers of life treated him gently and bestowed many joys upon him; and that portion of human suffering which was allotted to him deepened his wisdom and insight until, in his old age, he emerged as a living symbol of all in man that is truly great and lovable.

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15. CERN, created in the early 1950s with the aid and encouragement of Unesco, is now known as the European Laboratory for Particle Physics; it is situated in the frontier area straddling western Switzerland and south-eastern France.

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Biotechnology (not only 'Bio' but also 'Technology')

by Prof. Manfred Ringpfeil

Today, biotechnology is considered one of the most dynamic trends in developing productive forces. As it develops as a science its possibilities, limits and constraints will require close examination. At the same time the elaboration of a general technology also becomes necessary. This article outlines the subject of biotechnology and looks at its methods and theories in relation to a general technology.

Biotechnology as a key technology

In recent years, biotechnology has rapidly gained in importance and is now recognized as a major technology. This is largely due to developments in the biological sciences. The discovery of the genetic code and the manipulation of living organisms by purposeful chemical and biochemical intervention of their genetic structure can be ranked with the discoveries of electricity and magnetism¹. Results in biochemistry, microbiology, immunology and neurobiology, have led to the development of production techniques which will have a marked impact on industry, agriculture, ecology, the health services and other spheres of human life as well as far-reaching effects on the actual structure and methodology of production.

"The key question is therefore: is biotechnology capable of bringing about more profitable methods of production than the most advanced used today?"

The energy and raw materials crisis of the '70s made us all aware of the limited supply and unbalanced distribution of natural resources on Earth. Biotechnology, with its efficient biological mechanisms of synthesis, is increasingly being used to exploit raw materials capable of being regenerated. It is thus contributing to improving the economic use of the world's resources. However, development of new production techniques will only be successful if the methods being introduced are more economic than those currently employed.

The key question is therefore: is biotechnology capable of bringing about more profitable methods of production than the most advanced used today? Recent developments in the chemical industry have aimed at:

- an increased concentration of production (by using compact basic materials and high-speed processes);
- a higher density of energy flux of processes (by using strong fields of excitation for reactions);
- wider areas of stability of the systems used (by using highly durable auxiliary means).



Prof. M. Ringpfeil (Commission VI.2), Institut für Technische Chemie der Akademie der Wissenschaften der DDR, Leipzig, German Democratic Republic.

These trends are opposite in direction to biological processes. The latter are characterized by:

- a high degree of dilution (due to distributive excitations as, for example, with phototropic systems) or, at least, some degree of dilution which cannot be avoided completely (due to the necessity of having a loose structure for ensuring reaction);
- a low overall reaction velocity (due to the low excitations of reactions as well as their complex mechanisms); and
- narrow ranges of stability (due to their environmental needs, for example temperature, concentration, presence of water).

On the other hand biological processes possess several advantages over chemical processes. These include:

- their unique selectivity (one substance reacts in the presence of many others) and specificity (many substances give one product, or one substance produces one);
- their property of self-reproduction and self-repair;
- exploitability of heterogeneous and diluted raw materials which often cannot be used with any other method.

The subject of biotechnology

Biotechnology involves the research, development and description of industrial processes in which biological principles of action are decisive. These include the biotechnical processes used in the foodstuffs and allied industries, in the chemical and pharmaceutical industries and in water supply, agriculture and mining. The major task associated with these processes is the conversion of substances through the exploitation of the catalytic properties of biological systems. These processes thus fall between agricultural processes, which exploit more highly developed biological organisms as catalysts and chemical-industrial processes, which make use of abiotic substances as catalysts exclusively². Biotechnical processes may also have an impact on large-scale mushroom cultures, industrialized insect production, and the enzyme-simulating catalytic processes.

Today, emphasis is laid upon the exploitation of microbial actions. The relatively simple genetic manipulatability of microorganisms seems to suggest this emphasis will continue for years to come. Additionally, the culture of tissues and subcellular systems — particularly enzymes — should gain in importance. However, biotechnical processes can be used not only to convert one substance to another but also to separate substances. This is due to the ability of biogeneous molecules to recognize and bind with one another.

The subject range of biotechnology will undoubtedly be widened in the near future. This will depend on progress in the natural sciences, for example, in the biochemistry of industrially relevant molecules. It will also depend on technical development, for example, the development of specific reactors and specific measuring devices for biological processes.

Methods of biotechnology

The methods of biotechnology must be based on biological principles and also comply with the methods of technology.

The major difficulty in understanding the methods of biotechnology is the lack of a general technology. At present, technology in the sense of a science manifests itself in specified forms, for example, chemical technology, nuclear technology, and biotechnology. This prevents the discovery and use of methods which are valid for specific technolo-

gies. In this connection there are several points worth mentioning:

1. The process of obtaining knowledge in the natural sciences and its application in production is growing at an increasing rate.
2. Scientific methods are increasingly being used in production. As a result, the rate of growth of the technical sciences is increasing.
3. The fusion of science and production is becoming a decisive means for economic development.



High Performance Fermenter for Medium-Sized Aerobic Fermentation (located at Agrochemisches Kombinat Piesteritz/GDR; constructed by Chemieanlagenbaukombinat Leipzig-Grimma/GDR.

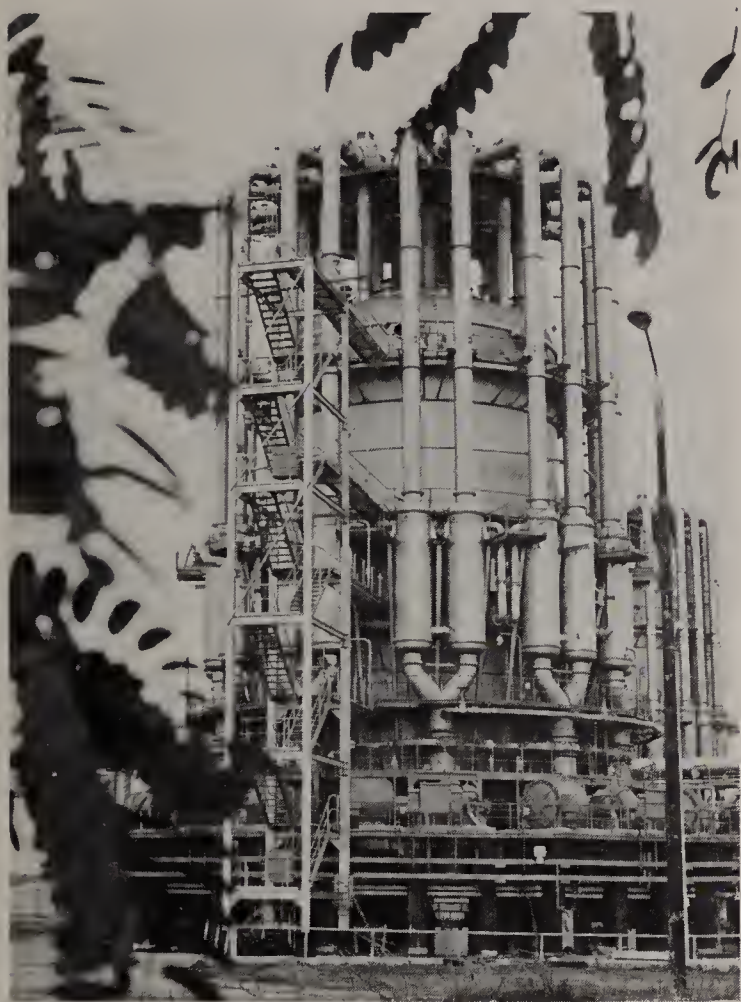
However, the development of a general technology cannot be separated from its specified manifestations. Scientific research brings about new working principles, the technical realization of which requires the development of specified forms of technology. This again might be facilitated and accelerated by the development and existence of a general technology, and a general technology — by virtue of its manifold manifestations — will be necessarily extended and enriched.

“The major difficulty in understanding the methods of biotechnology is the lack of a general technology.”

At present, innovation, optimization, plant design, balancing and adaptation to superordinated systems of economy are considered the major methods of a general technology³. They are derived from the general development of production processes which in turn are initiated by social needs and scientific results. Biotechnology activates some of the results of biological findings and develops

corresponding technical measures.

The concrete manifestations reveal the interdisciplinary nature of technology as a science most clearly. This nature will diminish with the transition to a general technology, which is intended to be the science of the processes of production in general and not of all the individual processes. As a science it combines biological knowledge and general technological methodology.



High Performance Fermenter for Large-Scale Aerobic Fermentation (located at Petrolchemisches Kombinat Schwedt/GDR; constructed by Chemieanlagenbaukombinat Leipzig-Grimma/GDR).

Theory of biotechnology

Each field of mental activity which claims to be a science should have its own framework of theories. Today, this is questionable for technology in general and for biotechnology in particular. It would be a basic error to claim that the theories specific to biological science are valid for biotechnology also. If at all, access to this problem will be reached through the consideration of a general technology. Technology provides guidelines for production processes. Thus, a specific guideline should be an element of the theory of technology: these specific guidelines we call concepts³. Their components are one or more scientific findings which act economically through technical application. The so-called *maximum concept*⁴ is an example of one of these concepts.

"For every individual production process there is a state showing its scientifically defined, possible maximum parameters — the maximum state of that process. The distance between maximum state and

the already industrially realized states is considered the field (or space) available for technological research for improving the process. Moving the parameters of the process towards their maximum values may result in a field (or space) in which any number of states are more profitable than those industrially realized. The degree of proportionality of the approach to the maximum state of process to the most favourable economic state is a measure of the quality of technological research."

This statement may give rise to the objection that the existence of a maximum state of a process is questionable from the viewpoint of the theory of cognition. We have to state at this point that a maximum state of process is defined by the level of scientific knowledge. For example, a microbial growth process reaches a maximum state. This is defined as the product of maximum specific growth rate and maximum possible cell concentration. If a genetically determined higher specific growth rate is imposed by, for example, gene manipulation, then a new maximum state of the process will be realized.

The maximum concept is appropriate for biotechnical processes, although it is also of general significance. Biotechnology does, of course, have specific concepts. The concept of a *Dynamic process control*⁵ is an example:

"A dosage of substrate adapted to cellular state and applied to a synchronized growing culture of microorganisms results in minimum coefficients of consumption."

This concept can be exploited usefully only in biotechnology.

Other examples of concepts in biotechnology include high-speed fermentation, solid-state fermentation, fermentation in non-aqueous solvents, mixed-substrate/mixed-culture fermentation, auxiliary-substrate fermentation, combination of cell multiplication and product formation as well as combinations of waste-water treatment and product formation⁵. Their common feature is that their technical realization is always based on the same principle but their details may vary infinitely.

These examples show how economic requirements of industrial processes may be linked to specific properties of biological systems. This creates the theoretical foundation for fully exploiting the capacities of biological systems.

Individual issues to be dealt with by technology

The following paragraphs introduce some of the problems involved in technological research work which need to be examined if a science of technology is to be practically and systematically developed.

1. The translation of scientific knowledge into production is a discontinuous process. The organization of technological research work thus has to be in line with economic developments.
2. When defining the trends of technological research the necessary items have to take prece-

dence over the desirable ones. To follow this principle does not mean limiting creative powers for solving these tasks but rather orienting them towards an optimum solution in terms of quality and time.

3. The differentiation between result-influencing and non-influencing deviations from the given states of production during the production process becomes a decisive means to accelerate the introduction of new processes.

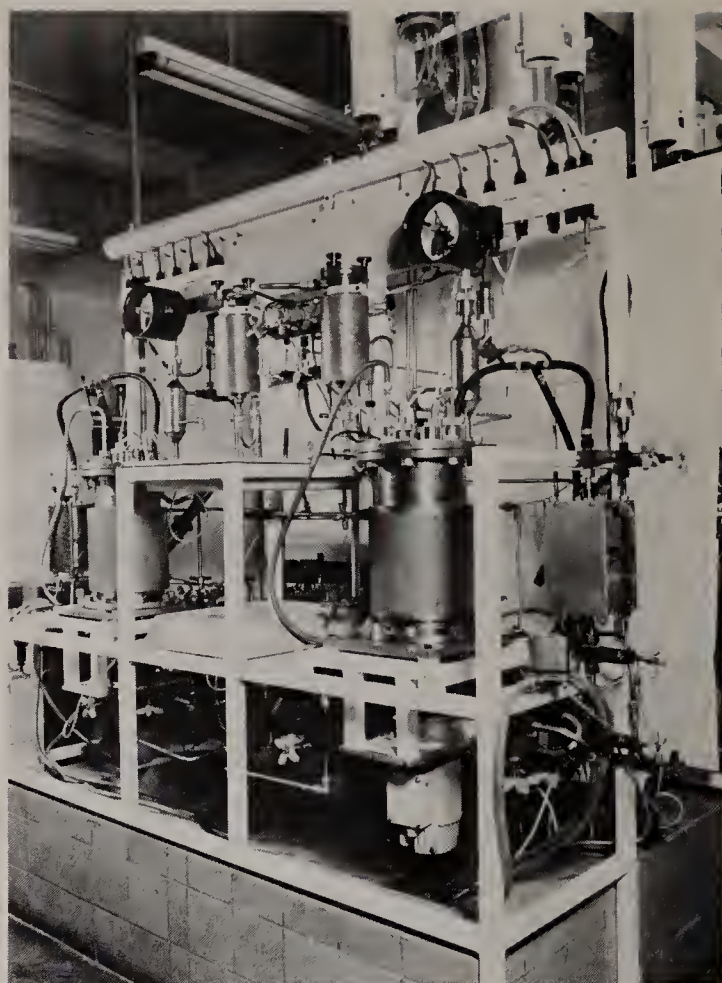
These items are of particular importance to the introduction of biotechnical production because:

- the industrial base of biotechnology is still small;
- the closeness of biotechnological research to advanced scientific standards makes biotechnical production attractive;
- the great complexity of biological processes complicates the evaluation of all the factors involved.

These problems show that components are available for the construction of technology as a science. Considered, solved and used within the appropriate framework they will surely contribute to a better control and scientific foundation of production.

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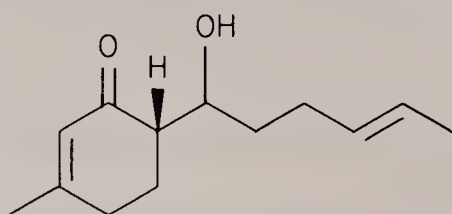


Pressure-Fermenters for Laboratory Studies of Aerobic and Anaerobic Fermentation (located at Institute of Biotechnology, Leipzig/GDR, constructed by VDE Leipzig/GDR).

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Have you met “Hernandulcin”?

May we introduce you to “Hernandulcin”,



In IUPAC he (or should it be she?) is known as (S) - 6 - [(R) - 1,5 - dimethyl - 1 - hydroxyhex - 4 - enyl] - 3 - methylcyclohex - 2 - en - 1 - one. Hernandulcin has risen to fame this year as a sweetener. On 28 January he featured prominently in *C&EN* (p. 37) and in April he appeared in *Chem. Br.* (p. 330). Why all this fuss?

It would seem that Hernandulcin is more than 1000 times sweeter than sucrose, (see *Science*,

Vol. 239, p. 417, 1985) and may well serve as a model for the synthesis of sugar substitutes. The compound was isolated by Douglas Kinghorn and his co-workers at the University of Chicago after they searched through Spanish literature on plants known to the Aztecs in Mexico. In a monograph entitled *Natural history of New Spain* written between 1570 and 1576 they found a reference to a sweet plant known to the Aztecs as Tzonpelic xihuitl meaning “sweet herb”. From the description of the plant, Kinghorn and his group were able to identify the plant as *Lipia dulcis*. They obtained specimens from Tlayacapan in central Mexico and used solvent partition and chromatographic separation to isolate the main sweet compound from the leaves and flowers. Its structure was determined by mass spectrometry and ^1H and ^{13}C NMR. They named the compound Hernandulcin after the Spanish physician Francisco Hernández who wrote the Mexican monograph.



The Lyon Council Reports

One of the functions of the IUPAC Council at its meetings is to receive and consider reports (1) by the President on the state of the Union, (2) by the Bureau, Executive Committee, Division and Section Presidents, and other bodies of the Union. Reproduced below are slightly edited versions of the reports of the President, Treasurer, Publications Committee and Finance Committee. These were all presented at the 33rd IUPAC Council held in Lyon, France: 6–7 September 1985 (see *CI*, No. 4, p. 15, 1985).

Report of the President on the state of the Union

It is a pleasure for me to present herewith my report on the present state of the Union to the 33rd IUPAC General Assembly. We are pleased that on this occasion the Assembly is being held in France, whose chemists represented one of the original founding members of the Union and over the years have continued to give it strong support. I would like to express our appreciation to Comité Français de la Chimie, and to the Local Organizing Committee, for the invitation to host this Assembly and for the excellent arrangements they have provided.

At the previous General Assembly held in Lyngby in 1983, where along with highly productive working sessions and reports of a host of important achievements, there was also a discernible apprehension and concern for the Union's future well-being. It will be recalled that at the time of the Lyngby meeting the world-wide economic recession still loomed large and currency exchange rates were becoming highly destabilized. Understandably this raised concerns about IUPAC's capability to provide adequate support to its established scientific programmes without incurring serious deficits.

The principal business of IUPAC, and in fact its "raison d'être", must continue to be highly significant scientific activities carried out through active international cooperation and collaboration. The value and the authenticity of its work on behalf of the world-wide chemical community is critically dependent on its quality. Only if the scientific quality is seen to be of a high level will the Union be able to continue to attract the most able chemists from all countries to volunteer their time and expertise to contribute to its endeavours. I would

like to take this opportunity to express to all the members of IUPAC Divisions, Commissions and Committees (who number well over a thousand individuals) our sincere thanks and appreciation for their dedicated work on behalf of the Union. We are well aware that this often means a heavy demand on their time and on their resourcefulness to overcome the limited financial support the Union is able to put at their disposal.

"Only if the scientific quality is seen to be of a high level will the Union be able to continue to attract the most able chemists from all countries to volunteer their time and expertise to contribute to its endeavours"

The scientific work completed and published by Commissions and Divisions during the past bien-nium adds up to a very impressive total. It is not possible to cite them here individually. They will be included in the Divisional Reports at the General Assembly. I would, however, like to note that in the past few years Commissions have made a special effort to complete on-going projects and to promulgate the results as expeditiously as possible. I would also like to record a special commendation to IDCNS, the Interdivisional Committee on Nomenclature and Symbols. Its task is to coordinate, integrate and seek the widest possible consensus on all IUPAC recommendations on nomenclature and symbols. Under the able guidance of its Chairman Dr K. L. Loening, the Committee carries

a heavy workload in successfully discharging its important mandate.

With respect to the now-established monitoring of all IUPAC programmes and projects we welcome Vice-President C. N. R. Rao's Critical Assessment Report. I would like to thank Prof. Rao for the conscientious manner in which he has carried out this difficult task and to congratulate him on having produced a most valuable report. It was discussed and approved by the Executive Committee and has been circulated. I would like to call attention here to three general conclusions in the report. First, that there is now a fairly wide acceptance of the value of this biennial review. The second that, in addition to increased productivity, Divisions and Commissions are organizing and planning their scientific programmes more effectively. Thirdly, all the Divisions seem to find the budgetary constraints and the lack of flexibility in operating the budget to be serious limiting factors. While steps have been taken during the past biennium to try to alleviate this problem it is clear that further improvements will be necessary during the next biennium.

The new Commission on Chemical Kinetics established at the last General Assembly has had preliminary organizational and planning discussions and should become fully operational at this General Assembly. Three previously suspended Commissions have been reconstituted with new mandates and a carefully planned new work programme. These are the Commission on Water Chemistry (formerly the Commission on Water Quality, VI.6), the Commission on Atmospheric Chemistry (formerly the Commission on Atmospheric Environment, VI.4) and the Commission on Radiochemistry and Nuclear Techniques (formerly the Commission on Analytical Radiochemistry and Nuclear Materials, V.7). The latter Commission has been reconstituted as an interdivisional Commission with the Analytical Chemistry Division as the lead Division. The terms of reference and the memberships of the above Commissions were approved by the Bureau at its meeting in Oxford, September 16–17, 1984.

Two further Commissions have been under review during the biennium. These are the Commissions on Medicinal Chemistry (III.4) and on Biotechnology (VI.2). At the Lyngby General Assembly a new Working Group on Medicinal Chemistry had been established to undertake wide-ranging consultations with the Medicinal Chemistry community and to prepare a report with recommendations to the Bureau. Because the Medicinal Chemistry community had become divided, the Working Group, headed by Prof. C. G. Wermuth, faced a very difficult task. However, thanks to hard work and persistence, a consensus has been reached by the community, and with strong support by industry, to reconstitute a programme for Medicinal Chemistry within IUPAC. The final report of the Working Group is expected to be available for the Bureau's consideration at Lyon.

With respect to IUPAC's future role in Biotechnology a number of recent developments will require the Union to resolve this issue at an early date. As pointed out in my critical assessment report



Dr Schneider, President.

two years ago, and reiterated by Prof. Rao in his current report, the Union's Commission on Biotechnology (VI.2) has not yet been able to develop a strong programme in this rapidly developing field. Because of its multidisciplinary nature the task faced by the Commission is no doubt more difficult. Meanwhile there have been other efforts and proposals to organize an international body to deal with biotechnology. These include proposals for an International Union for Biotechnology under ICSU, a Biotechnology Division under IUPAC, and an Inter-Union Joint Commission of several biologically based unions of ICSU and with IUPAC as the lead Union. After considering these proposals at its meeting in September, 1984, the Bureau concluded that IUPAC as a first priority must develop a stronger and more visible programme and expertise in Biotechnology within its present Commission as a necessary base, and to continue exploratory discussions with other interested ICSU Unions towards a satisfactory structure, which hopefully would complement and strengthen IUPAC's internal programme. Both of these actions have been initiated.

During the past biennium the programme of IUPAC-sponsored Conferences and Symposia continued at a high level, both in terms of numbers and scientific quality. (Only one major incident of a visa problem arose and thanks to the rapid and effective

intervention by the Executive Secretary this was averted.) The IUPAC Committee on Teaching of Chemistry (CTC) has had a very active programme during the biennium. At a time when science education is being re-evaluated in many countries, CTC provides a very useful international forum both for developed and developing countries. The Committee also maintains good liaison and collaboration with the ICSU Committee on Science and Technology in Developing Countries (COSTED).

As part of IUPAC's very successful CHEMRAWN programme, CHEMRAWN III under the title: "World Conference on Resource Material Conversion — (Bio)-Chemical Process Bridges to meet Future Needs", was held in The Hague during 25–29 June 1984. Scientifically, as were its two predecessors, the Conference was highly successful. The Perspectives and Recommendations together with the Plenary Lectures of the Conference are in press and will be available shortly. Unfortunately, unlike its two predecessors, and for a variety of reasons, the Conference incurred a serious deficit. Through subsequent fund-raising, and with the remaining surplus in the special CHEMRAWN Rolling Fund, most of the deficit has been covered. However, it will now require a special effort on the part of the CHEMRAWN Committee to replenish the Fund from the proceeds of future Conferences.

As part of the follow-up activities of CHEMRAWN II a highly successful briefing of officials in Sri Lanka on agricultural R&D policies stemming from recommendations of the Manila CHEMRAWN II Conference (1982) was held earlier this year. Attended by prominent members of the CHEMRAWN II Future Actions Committee and senior officials of the Sri Lanka government, universities and research institutes, the meeting was judged highly valuable and an important contribution to formulating future policies in the host country. Further follow-up briefings of this kind are planned in several other countries.

In recent years IUPAC has been gradually increasing its involvement and assistance to the scientific development of Third World countries. As an international body dedicated to the progress of chemistry and its applications to the benefit of Mankind, the Union must continue to reach out to assist chemists in countries not yet able to participate fully in IUPAC activities. Current programmes such as CTC and CHEMRAWN direct part of their activities in this direction. This is also an element in the planned IUPAC Affiliate Membership Scheme. An *ad hoc* Committee, chaired by Prof. H. Gg. Wagner, is evaluating a possible programme of selected IUPAC seminars. Additionally, several IUPAC Commissions have projects involving developing countries. IOCD, the International Organization for Chemical Sciences in Development with which IUPAC has become involved, is also seeking to launch worthwhile projects.

I believe it is necessary at this point to ask whether these various and largely uncoordinated projects will add up to a significant contribution and recognizable progress. By attempting to approach such an enormous problem simultaneously on many

fronts, with very limited resources, is likely to be a guarantee of slow and disappointing progress. Should the Union formulate a better overall strategy for development with well-defined goals, priorities and a coordinated, more focused programme?

In favour of such an approach is a better likelihood of attracting support from other international bodies and aid agencies. COSTED is currently reviewing its programmes of scientific development aid and is seeking the collaboration of ICSU Unions. One possible option for IUPAC, rather than scattering its limited efforts globally, might be to focus its projects to a greater extent to selected countries (or regions) further along the path to scientific development and with the potential of qualifying for full IUPAC membership within a decade. A number of Latin American countries, as well as some in the Middle East and South East Asia are examples of countries that would satisfy the above criteria. There is no question that such countries would ultimately benefit far more as active members of the IUPAC family than as passive outsiders with only occasional and unpredictable assistance from IUPAC. A move in this direction has been an attempt by the Union, in conjunction with UNESCO and involving FLAQ, to mount an imaginative initiative in Latin America. I believe a thorough reassessment of IUPAC's global role in scientific development assistance is both opportune and necessary.

In the area of scientific publications there have been some noteworthy changes during the biennium. After the termination of our publication contract with Pergamon and competitive bids from quite a number of highly rated publishers, Blackwell Scientific Publications was chosen as the new IUPAC publisher. Only the Solubility Data Series has been left with Pergamon. Under the terms of the contract negotiated with Blackwell's, IUPAC publications should have lower costs, wider circulation and yield greater revenue than in recent years. We are greatly indebted to the Publications Committee, the Secretary General, the Treasurer and the Secretariat staff for these successful transactions and negotiations.

"As an international body dedicated to the progress of chemistry and its applications to the benefit of Mankind, the Union must continue to reach out to assist chemists in countries not yet able to participate fully in IUPAC activities"

The appointment of a full-time editor for *Chemistry International* and Information Officer of the Union has been announced previously. Dr M. H. Freemantle has impressive credentials to bring to his new position and we are confident he will discharge his new duties with distinction. I would also like to record here our sincere thanks and appreciation to Mr R. W. Fennell for his excellent service as interim editor of *CI* and for the many improvements he brought to the news magazine.



École Supérieure de Commerce de Lyon (ESCL), venue of the Council meeting.

The Affiliate Membership Scheme, which had been widely discussed within IUPAC for a number of years, was formally approved in principle by Council at the Lyngby General Assembly. The Affiliate Scheme is designed to allow for affiliate membership of individual chemists in IUPAC in cooperation with the National Adhering Organizations and/or National Chemical Societies in member countries. Planned to be self-financing when fully operative, the scheme does entail some initial costs for its inauguration. However, at the Lyngby General Assembly, IUPAC Council did not approve a budgetary allotment for this purpose. IUPAC Officers interpreted Council's intent to mean that, while in favour of inaugurating the Affiliate Scheme, in view of the Union's unfavourable financial position it was not prepared to approve the necessary budgetary allocation at that time. Accordingly, it was concluded that, if outside funding sufficient to inaugurate the programme could be raised, planning towards its implementation should continue. These efforts have been successful. It is a particular pleasure for me to express our appreciation and gratitude to UNESCO, ICSU and the National Adhering Organizations of a number of countries for their special contributions towards the implementation of the Affiliate Scheme. It is now planned to inaugurate the scheme from the start of 1986 and a full report will be presented to the General Assembly at Lyon. Finally I would like to express our special appreciation to our Secretary

General, Prof. T. S. West, for his tireless efforts throughout the biennium towards bringing the Affiliate Scheme to fruition.

With the clear message of concern expressed by Council at Lyngby about the state of the Union's finances firmly in mind, IUPAC Officers set as their first priority a stringent regime of budgetary control and management. A second priority was to channel a relatively great proportion of available funds towards the Union's scientific activities *vis-à-vis* general overhead operating costs. This was achieved in part by rescheduling meetings of the Executive Committee and the Bureau during the biennium so as to realize substantial savings. These made possible subsequent additional allocations to the seven scientific Divisions. The total budgetary allocations to the latter are, however, still at a low level. With an improved financial position of the Union now in prospect for the next biennium, it is hoped a further augmentation of Divisional allocations can be realized. There is no doubt that this would greatly enhance both the efficiency and productivity of Divisional activities.

A further consideration which must be kept in mind is that increased programme activity also puts an increasing workload on our Secretariat. These are the inevitable overhead costs. Following a review of the Secretariat operations by the Secretary General, and having instituted some changes and reorganization to improve cost-effectiveness, it is now also clear that the Secretariat has a more than

full workload with its present staff complement.

An in-depth review of the Union's budgeting, cost control and accounting procedures has been undertaken by the Treasurer, Prof. A. Björkman. An immediate goal of this review is to develop a system to provide better up-to-date information on revenues and expenditures during the course of the biennium. A further goal is to provide Council with more detailed financial reporting. I have felt for some time that the highly condensed financial statement normally provided by our accountants, and legally sufficient, is inadequate. A supplementary account detailing how the Union's dollars were actually spent and for what purposes would be highly valuable.

At the last General Assembly Council adopted a mathematical formula (proposed by the UK Delegation), based on the most recent chemical turnover data, to determine annual membership subscriptions. Implementation of this scheme has gone fairly smoothly although, as in previous procedures, a number of individual cases had to be dealt with through further consultation and resolution. I would like to express our appreciation to the Finance Committee and to the Treasurer for their advice and for their successful efforts in this regard.

Adoption by Council of the new subscriptions structure has outdated the previous voting arrangements in Council by assigned "categories". This question was not dealt with at the last General Assembly and was deferred for consideration at this Assembly. After careful study the Bureau has developed a proposal for a new voting regime which is being presented to Council for consideration and decision. Adoption of this scheme will entail a number of statutory changes. Texts for these have been duly circulated. I believe the proposed voting arrangement to be fair and in keeping with IUPAC's traditional evolution, and I strongly recommend it for your favourable consideration.

I would like to conclude my report with some thoughts about the outlook for the future. The past biennium has been a period of consolidation to try to regain improved financial equilibrium and stability. As has been mentioned previously, some current activities are still underfunded. At the same time we are faced with proposals for new programmes and projects. This, of course, is healthy and to be welcomed. IUPAC, if it stands still, would quickly atrophy. If it is to remain relevant and responsive, it must always retain the flexibility and capability to address new problems and opportunities within its orbit. The Union has abundant intellectual resources at its disposal, but to engage these resources requires some financial commitment. A simple answer would be to say no new projects can be undertaken unless older projects are terminated. To a degree this is being done and must be done. But internal reallocations alone are usually insufficient and generally too slow to meet the criterion of timeliness for important new opportunities or needs.

The prospect of additional revenue by increasing national subscriptions does not appear realistic for the immediate future. In fact, such a strategy could



Rendez-vous with chemistry!

be self-defeating at a time when the Union is endeavouring to attract new member countries from emerging Third World countries.

In my view the recurring income from national subscriptions should provide ongoing support to the Union's traditional base programmes in nomenclature, standards, data compilation, publications, scientific conferences, etc. — that is for activities which are of direct benefit to the world community of chemists. For certain projects of potential benefit to particular sectors it would seem reasonable to solicit additional external funding from those sectors. For example, projects with high relevance to health, agriculture, environment and development programmes should seek support from UN agencies. Projects of high relevance to industrial technology might seek support from industry or industrial associations. The advice and assistance of COCI in this respect would be valuable. It should be noted that the Macromolecular Division has a history of close collaboration with industry. The potential for industrial collaboration also exists for the proposed new initiatives for Medicinal Chemistry and for Biotechnology. It is generally easier to build in such collaboration at the start, when new programmes are being planned, rather than at a later stage when the programme is cast in stone and the entire project team has been engaged.

These suggestions are, of course, not new. Nevertheless it now seems difficult to escape the conclusion that if the Union is to maintain its current programmes at an efficient and productive level and to have the capability to engage in timely new activities, an infusion of additional external funds is needed. Fund raising is never easy even with good causes. As the Officers discovered in soliciting external support for the Affiliate Membership Scheme, it demands a considerable expenditure of time and effort. But this may well be a necessary investment we have to make to ensure a healthy state of our Union for the future.

It is a particular pleasure for me to express my great indebtedness to my fellow Union Officers and to the members of the Executive Committee and the Bureau for their assistance and support during my term as President. To the Executive Secretary, Dr M. Williams, and his staff in Oxford, I owe a special debt of gratitude for facilitating my task and for the efficient and dedicated manner in which they have conducted the day-to-day affairs of the Union. It has been a pleasure and a privilege for me to serve the Union, as well as a very rewarding experience in working with some many dedicated and talented individuals towards our common goals.

W. G. Schneider
President

Biennial Report of the Treasurer (1983/84)

My term as Treasurer commenced 1st January 1984, though I acted as an Observer from my election at the Lyngby General Assembly (1983). The IUPAC finances, as inherited from my predecessor, Dr W. Graulich, were in a favourable state. This report is to some extent a presentation of plans for future financial improvements. Reference is made to the 1985 report from the Finance Committee by Dr H. F. Wilson.

Over the biennium 1983/84 IUPAC has had a considerable *excess* of income over expenditure:

1983	US-\$ 27 600	(budgeted	—90 500)
1984	US-\$236 300	(budgeted	105 500)

Total	US-\$263 900	(budgeted	15 000)
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There are several main reasons for this outcome:

- Increased income from subscriptions from member countries (outstanding payments render the annual figures somewhat indefinite).
- Higher interest and dividends (due to sound investment policy).
- Reduced expenditure at the Oxford Secretariat (owing to favourable US-dollar/£-sterling exchange rate).
- Lower expenditure by Committees and Divisions.

Comparison of the statement of accounts with the budgets is difficult because of unbudgeted items, such as carryover of committed Divisional allocations and CHEMRAWN transactions. Steps have been taken to improve budgeting and to attain better compatibility with the accounts. The high rate of the US-dollar has relaxed the need to increase the per diem allowance.

For many years it has been something of a natural law within IUPAC that income ends up to be in excess of expenditure. The reasons for this phenomenon appear to differ between the years. Committee expenditure (Divisions) is transferred from a non-Assembly year to the next and the money thus stays within the budgets. Excess income due to lower expenditure passes into the IUPAC assets (funds) — some such increase being good management to match inflation — and will yield more income as interest/dividends.

The budgets, as prepared within the Finance Committee and proposed by the Bureau, do reflect — when accepted by Council — the willingness of member countries to support a desired level of IUPAC activities. Over the years there develops a kind of balance between this activity level and the way IUPAC bodies learn to live with their allocated portions of the income. In recent years one major measure to keep this balance has been savings on costs, for example by the use of cheaper travel and restrictions of the number of Titular Members. If the balance is disturbed there may be for some time a need to draw on the assets, but such a period has to be restricted and IUPAC must decide whether to increase income (subscriptions) or to decrease activities.

The Leuven/Lyngby subscription structure



Prof. A. Bjorkman, Treasurer.

(formerly “dues structure”) is expected to smooth the handling of subscriptions, though some time may be required to find individual solutions to member countries in distress. In conjunction with the Executive Committee I have devoted considerable time for negotiations with several National Adhering Organizations, which have mostly responded favourably. Yet more work remains to finalize the implementation of the new structure. There is a need for NAOs and Council to be kept well informed about the subscription structure and the above-mentioned balance between activities and financial requirements.

Another need is improved budgeting within Divisions. The Divisions are the work horses of IUPAC, but the horses move on different grounds and display variations in size, need of fodder, and so on. Divisions have been forced to stretch resources to accomplish as much as possible of the intended programmes. The officers must be familiar with Divisional operations in order to generate optimal allocations. A major improvement will be the “A” and “B” budgeting, proposed by President Schneider and to be introduced into the 1986 and 1987 budgets under the headings “current” and “priority” programmes. If some Division cannot make use of the entire sum allocated, it is contemplated to reallocate such money within a biennium.

Improvements and amplifications of Divisional activities may justify in some cases an increase of up to eight Titular Members in Commissions, but a

general return to this number is not likely to be permitted under present financial conditions.

The Finance Committee has felt uneasy with regard to the financial handling of the CHEMRAWN Conferences and proposed in 1983 that the Treasurer takes part in the work of the CHEMRAWN Committee and follows closely future preparations of these Conferences. At the first Committee meeting I attended just after CHEMRAWN III (1984), the news of a large deficit for that Conference became known. Considerable efforts have been made — not least by the Netherlands — to eliminate the deficit through additional contributions from various sources, but in the end it has been necessary to use up most of the CHEMRAWN rolling fund (US-\$23 000), and in the 1985 budget there is provision to cover the remaining deficit (US-\$25 000). A second misfortune of this kind would be the end of CHEMRAWN. I have studied carefully the budget for fund raising for CHEMRAWN IV (1985) in view of a possible request for postponement. Due to great efforts by the organizers, the risk for a CHEMRAWN IV deficit is reduced to an acceptable level.

At the Lyngby General Assembly (1983) the plans to use student dormitories had to be abandoned. In spite of this and the highest ever attendance of Titular Members, the final expenditure was limited to US-\$288 500, less than the budgetary allocation (US-\$292 000). In Lyon the use of student facilities will allow for considerable savings.

Though the costs for the Oxford Secretariat and the IUPAC banker in Switzerland are kept moderate, uncontrolled increase should be avoided. Plans are being developed to rationalize the paperwork of expenditures, while keeping the statutory responsibility of the Treasurer intact. An advantage will be that the Treasurer can devote more time to planning and budget work.

The income from the previous IUPAC Publisher, Pergamon Press, has been an improvement over earlier times. Yet, as the contract had to be renewed, it was felt by pertinent IUPAC experts that several publishers should be asked to present contract tenders. The negotiations confirmed that this part of IUPAC financial performance could be improved considerably through a shift to Blackwell Scientific Publications. However, the Solubility Data Series has been kept with Pergamon Press through a renewed contract, favourable to IUPAC.

Most of the items presented above and other financial matters (for example, US-dollar as operating currency of IUPAC) have been given valuable comments and proposals within the Finance Committee. I wish to express my gratitude to the Chairman, Dr Wilson, and the other members for their devotion and help. The Committee is a vital forum for discussion of financial matters and policy. Likewise I would like to thank President Schneider and my fellow Officers for their positive interest and support.

It is a pleasure to report my great satisfaction over the good cooperation and efficient service I experience from the Oxford Secretariat, particularly through Dr M. Williams and Miss Ann Troughton. I

would also like to acknowledge the fine assistance given by Mr Th. Fehr of the Union Bank of Switzerland.

In addition to the responsibility for budget preparation and control, the Treasurer is a guarantee to the Bureau and Council, that expenditures are authorized and accounts are maintained correctly. It is my sincere desire that I can continue to cooperate well with all IUPAC people and bodies involved in order to promote the very best activities of our Union.

Anders Björkman
Treasurer

Report of the Finance Committee

The income from interest and dividends from the Union's Reserve Fund amounted to \$183 732 for the 1983–84 period, an increase of 47.1% over the income from interest and dividends received in the preceding biennial. This income from interest and dividends contributed 18% of the operating expenses of the Union for 1983–84. The total amount of the Reserve Fund continued to grow and amounted to nearly \$400 000 over the operating expenses of the last two years.



Dr H. Fred Wilson, Chairman, Finance Committee.

These excellent financial results are primarily due to the high interest rates and the strong US dollar that existed during this period. The Union has unique financial needs in US dollars and English pounds, plus Japanese yen and a variety of European currencies. We have concluded that we cannot

find a professional manager who will respond to our particular needs. We will rely on the knowledge and experience of a person actively involved in international finance and a friend of IUPAC, a role that Dr A. F. Hartmann fills so admirably.

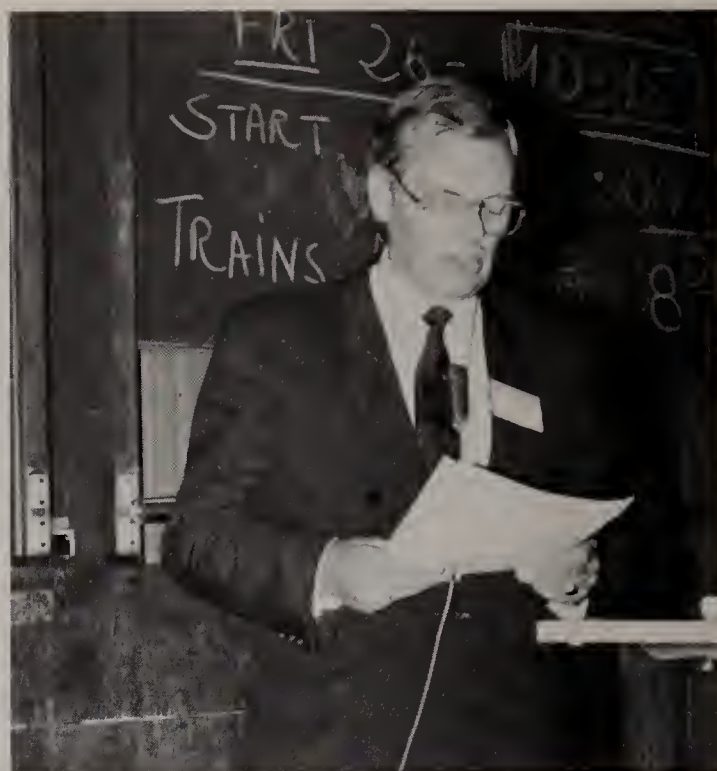
Dr Peter Agius and Prof. G. Zaikov complete their service on the Finance Committee in 1985. We appreciate their active participation and counsel in our deliberations. Dr Agius has been an effective watchdog on Union expenditures and has been quick to alert us on potential financial problems. Prof. Zaikov has informed us on the special situation of the Socialist countries and arranged a dues schedule payment that is satisfactory to the Union and the NAO. We will miss them both as valued friends.

H. Fred Wilson
Chairman

Publications Committee Report

The most dominant activity of the Committee during the biennium 1983–85 had been in the selection of a publisher. Through careful procedures, fully supported by the Oxford Secretariat, a number of major international scientific publishers were invited to tender for the sole publishing contract; ending up in a smaller number with whom negotiations were continued in comprehensive detail. In the final sessions during the summer of 1984 a recommendation was put to the Executive Committee leading to the appointment of Blackwell Scientific Publications Ltd (of Oxford, UK) as the main official publisher. In January 1985 the new publisher took over the IUPAC publishing programme with the exception of the Solubility Data Series. Much to our relief the taking over went smoothly enough and did not cause any discontinuity — for which we are indebted to both the former and the new publisher. A new contract for continuing to publish further volumes in the Solubility Data Series has been negotiated with Pergamon Press. Both contracts are designed to generate increased income for the Union as well as keep the prices of publications under control; the latter in turn is expected to increase distribution.

The official monthly journal *Pure and Applied Chemistry* (PAC) has been run by the Scientific Publications Secretary, Mr P. D. Gujral, as its Executive Editor. This arrangement has continued to be very successful both in achieving the regular frequency of appearance and shortening of publication time. On more than one occasion the main papers of an IUPAC-sponsored symposium appeared in an issue of the journal at the time of the symposium! The discussion on the future policy for PAC, which started at Lyngby in 1983, was extended through correspondence on the basis of a discussion paper released in early 1984. In future, policy decisions on the content of the journal are to be prepared by the newly established PAC Editorial Advisory Board, which will meet for the first time at Lyon in 1985.



Dr D. P. den Os, Chairman, Publications Committee.

The bimonthly news magazine *Chemistry International* continued to be edited by the (temporary) editor, Roger W. Fennell, until he was finally succeeded in April 1985 by Dr Michael H. Freemantle. Roger, who was originally appointed for a few issues, had served patiently for a much longer period. His influence on the content made a tremendous improvement, so the magazine is now in good shape to serve the expected increase in readership through the Affiliate Membership Scheme.

In addition to volumes under the Solubility Data Series (four volumes published, two volumes expected to be published by the end of August 1985, three further volumes in Pergamon's production department) there was a modest increase in other books in the Chemical Data Series — three new books are expected to be on view at Lyon. A major reference book *Oxidation-Reduction Potentials in Aqueous Solution*, under publication by Marcel Dekker as a one-off contract¹, will be available at Lyon. In addition to the symposia books published by the official publisher (Pergamon, up to 1984; Blackwell in 1985) books based on symposia were published by Academic Press, Ellis Horwood, Gordon & Breach and Hüthig & Wepf; the last two issued them as supplements to their journals *Phosphorus & Sulfur* and *Makromol. Chem.* respectively. In all these cases the official publisher at the time had declined publication. Books published under one-off contracts generate additional income for the Union. Mr Gujral is to be commended for these initiatives.

I would like now to draw attention to the income generated by publications. After deduction of all expenses (salaries, share of Secretariat costs, etc.) the Union's publications made a net contribution to IUPAC funds of US-\$42 693 in 1983 and US-\$60 642 in 1984. I am hopeful that the budgetary estimate (as of 85.2.19) in 1985 of the net income of US-\$72 500 from publications will be exceeded when this year's accounts are prepared. In addition

to these figures there is a further hidden income from publications in the new contract. The General Purposes account will not be debited in future towards production/postage costs of some 1500–1600 copies of *CI* distributed within IUPAC; for example in 1983 the Union had to spend US-\$18 221 for this purpose.

In June 1984 I attended, as an observer, the first meeting of the *ad hoc* Advisory Committee on Numeric Data Bases in London. The potential inside IUPAC to play an important role in the production and marketability of chemical data files is certainly present. At the same time there is a large overlap between the hard-copy publishing activities and the data files generated by the Commissions of the Union. The logical conclusion drawn at the meeting of the publications committee (Oxford, 84.7.1–3) to enlarge its scope in future to “Publications and Communications” — in order to cover the whole contemporary spectrum of means for information transfer — has not been supported so far by the Executive Committee or Bureau.

The ICSU Press, on which I reported earlier, is

developing steadily and may in future also be a service organization to IUPAC. The Press introduced the innovative presentation of congresses and symposia in the form of so-called Short Reports.

Having already announced my retirement after the General Assembly at Lyon, I wish to express my sincere gratitude for the exciting experience I was able to gather during the time I attended the General Assemblies — as from 1969 — and, in particular, during the chairmanship of the committee — as from 1979. During the whole period I have been impressed by the effective and efficient support from the Oxford Secretariat staff, to mention particularly Mo Williams and Dass Gujral, each in his own capacity. In addition I am grateful to my colleagues on the Committee (S. Maricic, T. H. G. Michael, B. Munsch, D. A. O’Sullivan and I. A. Williams) for their expertise and critical discussions. Most of all I thank all those mentioned for their patience with me, while I went my way.

Dick P. den Os
Chairman

SUMMARY MINUTES

Commission V.4 — Spectrochemical and Other Optical Procedures for Analysis: Bratislava, Czechoslovakia, 23–24 June 1984

The main objectives of the meeting were to review progress in those documents which were in the final stages of preparation. These included Part V “Radiation”, Part VIII “X-Ray emission classification”, Part IX “Spectral dispersion and isolation” and Part X “Sample preparation”.

Other parts were also discussed. It was decided that with Part XI “Radiation detectors”, although it had been decided at Lyngby that there would be three separate sections, it would be more convenient to have one part only to avoid duplication of effort. Word lists would have to be prepared for the other parts on electrothermal atomization and hydride generation, laser spectroscopy, and atomic fluorescence.

L. R. P. Butler

Commission V.5 and the Subcommittee — Electroanalytical Methods of Environmental Trace Analysis: Julich, FRG, 22–24 October 1984

The Commission took note of the completion of the following projects:

Voltametry at Glassy Carbon Electrodes (final report published, see below).

Standard Potentials of Amalgam Electrodes and Activity Coefficients of Metals in Mercury (final report in press, see below).

The following publications have appeared in print or are currently in press:

Diffusion Coefficients of Metals in Mercury: *PAC*, **56**, 635–44 (1984).

Voltametry at Glassy Carbon Electrodes: *PAC*, **56**, 1095–129 (1984).

Standard Potentials of Amalgam Electrodes in Aqueous Solutions, Temperature Coefficients and Activity Coefficients of Metals in Mercury: *PAC*, **57**, in press, January 1985.

Purification of Solvents for Electroanalysis: Tetrahydrofuran and Dioxane: camera ready copy in preparation for publication in *PAC* (1985).

The Subcommittee on Electroanalytical Methods of Environmental Trace Analysis has completed the following reports which will be published in the book, *Methods for the Determination of Trace Metals in Natural Waters*, compiled by Division V:

Voltametric Methods for the Trace Analysis of Heavy Metals with Exotoxic Significance in Natural Waters.

Electroanalytical Measurement of Trace Metal Complexation in Natural Aquatic Conditions.

Initiation of the following new projects will be formally considered at Lyon.

Flow-Through Electroanalysis

Ion Chromatography and Ion Chromatographic Detectors

Mathematical Treatment of Signals and Computerization in Electroanalytical Chemistry.

K. Izutsu

Commission V.3 — Analytical Nomenclature: Washington DC, USA, 28 October 1984

T. Pilkington expressed ISO concern at the use of the term "spectrophotometry", recommending that it be replaced with "spectrometry" in all V.3 publications. A joint meeting of Commissions V.3 & V.4 is scheduled for the Lyon General Assembly to resolve this issue.

Prof. den Boef pointed out that the IUPAC Bureau is aware of the strengths of the Analytical Division. The Bureau is also looking at Division projects as a "showcase".

A new project was suggested on "collaborative analytical studies", to be preceded by a document on presentation of analytical results. Another suggestion was for a core document of analytical nomenclature (an updated version of the Orange-Book version), as a Division project. It was suggested that computerized data base methods be adopted for all analytical nomenclature.

Status of Commission Projects

1. *Nomenclature of Kinetic Methods of Analysis*: The document is expected to be accepted/published as a provisional document at Lyon.
2. *Nomenclature of Sampling*: The document should be distributed to 15 experts and 3 editors as prescribed by IUPAC. After obtaining their comments the revised document will be forwarded to the Division Committee and to IDCNS.
3. *Nomenclature of Information Storage and Retrieval*: This document (with modifications) will be sent out for review by 15 experts and three editors, following the same basic procedure as for (2) above.
4. *Nomenclature of Automated Analysis*: There is no more work to do on this document. It should be published by the Lyon Meeting.
5. *Presentation of Results of Chemical Analysis*: This has been accepted by the Division Committee and will be a provisional document.
6. *Terminology of Environmental Analysis*: A revised version will be provided for the Lyon Meeting. Terms related to "sampling", and covered in (2) will be left out.
7. *Nuclear Analysis Nomenclature*: An updated document of defined terms was submitted. Problems identified were that some terms were not yet defined, and there was a lack of medical terms. Recommended action was to incorporate missing terms defined by other organizations and provide the revised document for distribution before Lyon.
8. *Chromatography Nomenclature*: The "final" copy is to be distributed to Commission V.3 for discussion at Lyon.
9. *Ion Exchange Nomenclature*: A document will be provided for distribution to Commission V.3 for discussion at Lyon.

10. *Nomenclature of Bioanalytical Methods*: The Lyngby decision was to break this document down into two or three sub-topics. Currently the sub-topics are "General Nomenclature" and "Classification of Analyzers". There was insufficient advance availability to evaluate the analyser document. The general comments concerning the Bioanalytical Nomenclature document suggested that many terms were redundant with already existing V.3 nomenclature documents.
11. *Nomenclature of Chemometrics*: There was a problem with this project in that Commission V.1 had also started a project on nomenclature of pattern recognition.
12. *Nomenclature of Papers for Publication in Luminescence Spectroscopy*: A final revised copy was provided after Division Committee comments.
13. *Nomenclature of NMR and EPR Spectroscopy*: No input.
14. *Nomenclature of Thermometric and Enthalpometric Methods*: For the Lyon meeting a new outline is needed showing the breakdown into two separate documents, with new items to be included.
15. *Nomenclature of Electroanalytical Separation Techniques*: A document will be prepared for discussion at Lyon.
16. *Nomenclature in Evaluation of Analytical Methods*: Discussion suggested that the present document overlaps with (5) (Presentation of Results of Chemical Analysis). The revised document, with a focus on "evaluation of methods", is to be distributed at Lyon.

Projects developed by other Commissions and submitted to V.3

The VII.1 project on "Electronic Data Processing and Microprocessors" possibly overlaps with the V.3 project on Information Storage and Retrieval (3).

S. Perone

Commission VI.6 — Water Chemistry: London, UK, 8–9 March 1985

The purpose of the meeting was to prepare a tentative agenda, and suggest a working schedule for potential projects in order of priority; and hence expedite the start and performance of the Commission meeting in Lyon.

A suggested list of projects was prepared in advance of the meeting by correspondence between Dr Frehse and Members. This project list, and additional projects notified by Commission Members was discussed in detail in London. It was agreed that the Commission should concentrate on (1) areas of work which had not been dealt with by other groups or organizations, with a view to making recommendations on key topics; (2) the preparation of definitive statements; (3) the production of guideline documents, literature surveys and reviews; and (4) the stimulation of relevant research. It was considered useful to carry out detailed studies on a limited number of environmentally important issues

that have not been dealt with adequately in the past and to consider organizing international workshops, on the basis of restricted attendance by experts, dealing with important single topics.

Priority topics

The removal of non-biodegradable substances and heavy metals from waste-waters by pretreatment processes was identified as a high-priority topic. Also considered important for early attention were:

- (a) a study of the production of dangerous substances, by the reaction of trace pollutants in discharges with natural products in river waters, and analytical difficulties associated with their identification;
- (b) the use of activated carbon in the activated sludge process; and the improvement of the kinetics of BOD reduction by the use of ozonization;
- (c) the evaluation of toxicity test procedures used in different countries;
- (d) the provision of advice to water chemists in Third-World countries, via IUPAC publications;
- (e) highlighting sample preparation problems, and the need for relevant analytical methods with adequate performance, particularly for marine waters.

Commission Members would be requested to provide papers, for the Lyon meeting, outlining their national situation with respect to these identified topics. It was considered important that the Water Chemistry Commission was aware of relevant documents produced by other national and international organizations; such documents would be welcomed and should be sent to Mr J. A. Tetlow, c/o Anglian Water, Ambury Road, Huntingdon, Cambridgeshire, PE18 6NZ, UK.

J. A. Tetlow

Commission V.4 — Spectrochemical and Other Optical Procedures for Analysis: Bratislava, Czechoslovakia, 20 April 1985

The objectives of the meeting were to discuss the requirements for Lyon, as well as review progress on the various documents.

Concern was expressed at the small number of members who had indicated that they would attend the General Assembly. Dr Butler would try to persuade more to attend, notably those responsible for documents in their final stages. It was also noted that several members had not reacted to tasks and duties which they had undertaken.

The various parts were reviewed and project leaders would be contacted for final reports on the status of their documents.

It was decided that to ensure continuity of purpose of this important Commission, a document

should be prepared called "Code of Practice of Commission V.4". With several older members retiring, it was felt that it would be beneficial to incoming Commission members if the system which had evolved over the years could be available to them. Dr Butler would draw up a draft document for discussion at Lyngby.

L. R. P. Butler

Analytical Chemistry Division Executive Committee: Paris, France, 21–22 April 1985

Division Projects

Harmonization of collaborative studies. Division V will take the lead on behalf of IUPAC on this project and is prepared to represent IUPAC in contacts with the Association of Official Analytical Chemists (AOAC) and International Organization for Standardization (ISO) in this context. Prof. Pellerin will be proposed as the project coordinator for IUPAC for the period September 1985–September 1987. He will be on the Division Committee as coopted member during that period.

Water Project. Two volumes are now in press. A contribution of Commission V.4 for a third volume is in preparation. In Lyon the future of this project will be discussed with the Commissions.

Orange Book. The material for the new edition is now nearly ready. It will probably be word-processed and sent to the Chairmen of Commissions and to the members of the Division Committee requesting their opinions and suggestions. These will be passed on to Prof. H. Freiser and Prof. G. H. Nancollas.

Multilingual Dictionary. A number of problems were considered: (a) The dictionary is based on the index of the old orange book, which is now out of date; (b) A translation of the index is not sufficient; a definition of each term in English should be available; (c) There are doubts on the financial outcome of the dictionary. The meeting concluded that there is no realistic future for this project. It will be discussed in the meeting of the Division Committee in Lyon.

Future Division Projects. Concerning a proposal by Prof. Sheppard on analytical help for developing countries the meeting did not see any possibility of starting a project on this topic. Analytical procedures on non-sophisticated apparatus have been extensively reviewed. Any specific question from an underdeveloped country to IUPAC should be sent to the President and Secretary of the Division for further consideration.

The creation of a divisional subcommittee or an interdivisional committee or a joint project on biotechnology was suggested.

G. den Boef

PROVISIONAL RECOMMENDATIONS

IUPAC seeks your comments

The procedure for comment on and approval of IUPAC recommendations on nomenclature and symbols is given in the *IUPAC Handbook 1983–1985*, p. 121. This procedure is now in operation and a synopsis of the latest Provisional Report is reproduced below.

It must be emphasized that copies of the full report cannot be obtained from the IUPAC Secretariat but only from your own national/regional centre. The most up-to-date list of national/regional centres appeared in *CI*, Vol. 7, No. 2, p. 13 (1985). Copies will be sent on request but on the understanding that comments will be sent to the address on the document not more than 8 months after publication in *CI*.

Electrochemical Corrosion Nomenclature

The aim of this document is to provide scientific definitions in the field of corrosion. Because of its great practical importance, corrosion terms have already been defined for the purpose of technical standardization. The present document avoids disagreements with the earlier definitions if possible and concentrates on a more complete or rigorous description of the physicochemical basis of corrosion terms. As a consequence, terms of fundamental importance, only, will be discussed. Those of entirely technical importance are found, for example; in a recent document of the International

Standards Organization (ISO) which in part was worked out in collaboration with the IUPAC I.3 Commission on Electrochemistry. Technical definitions refer to corrosion of metals, but corrosion also affects other materials. This fact is taken into account in the general definition of corrosion given below. The major part of corrosion reactions are of an electrochemical nature. This document concentrates on electrochemical corrosion, that is corrosion due to charge transfer.

Comments on these recommendations are welcome and should be sent before the end of May 1986 to: Dr K. E. Heusler, Abteilung Korrosion der Technischen Universität Clausthal, Agricolastrasse 2, D-3392 Clausthal-Zellerfeld, Federal Republic of Germany.

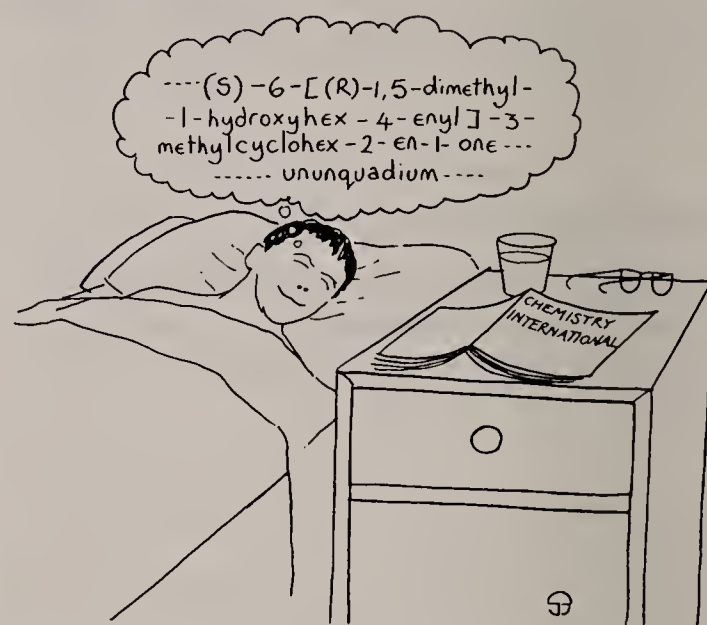
IUPAC PUBLICATIONS

Solubility of the oxides and hydroxides of gold and other metals

Volume 23 of the *Solubility Data Series* is to be published by Pergamon Press at the end of this year or early next year. The volume is entitled 'Copper, silver, gold and zinc, cadmium, mercury oxides and hydroxides'.

This volume presents and evaluates the liquid solubility data for the oxides and hydroxides of copper, silver, gold, zinc, cadmium and mercury. More specifically, the solubility data and critical evaluations are for the following solids: copper(I) oxide; copper(II) oxide and hydroxide; silver(I) oxide; silver(II) oxide; gold(III) hydroxide; zinc oxide and hydroxide; cadmium oxide and hydroxide; mercury(II) oxide. All solubility data are, with one exception, for aqueous solutions. The one exception is for the solubility of Cu_2O and CuO in acetonitrile and in methyl acetate. Only a few data are given for this system and the work has not been subjected to a critical evaluation.

The literature for these systems has been covered up to 1984, but very few data that were published



before 1900 have been included. Values for the formation constants of metal ion-hydroxide complexes, based on solubility data, have been included. For a few systems such data have also been included for metal ion-ammonia complexes.

All the solubility data collected under hydrothermal conditions are included. However, for a given system, there are not enough such data to permit values to be recommended.

T. P. Dirkse

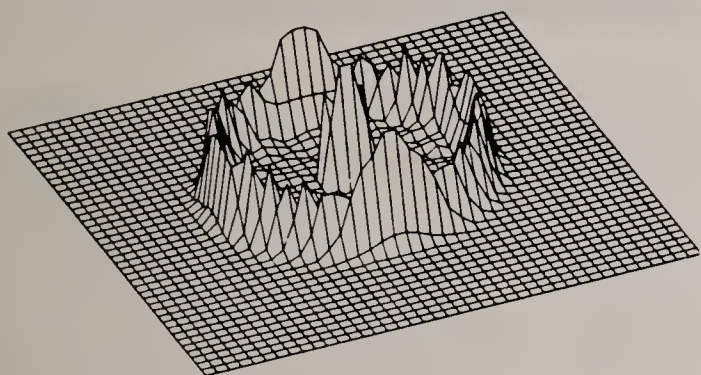
Handbook of thermodynamic and transport properties of alkali metals

The purpose of this *Handbook* is to summarize and assess the vast amount of available data and to provide both the practising engineer and basic research worker with current knowledge on structural, thermodynamic and transport properties of alkali metals. In order to guarantee a comprehensive and up-to-date survey of the field, an international team of about eighty leading scientists from throughout the world was invited to assess their own specialization as it applies to alkali metals.

The first two sections of the *Handbook* cover the basic relationships and theory of liquid metals, including the latest developments in model approaches and computer simulation, and provide the necessary background and present status. Section 3 on technological applications summarizes the various applications of alkali metals in modern technologies. Section 4 gives a complete survey of the existing techniques of high-purity preparation and its analytical aspects. A special chapter is devoted to safe handling. The structural, thermodynamic and transport properties and their methods of evaluation are critically assessed in sections 5 to 7. Solutions of non-metals in alkali metals are treated in section 8, and in section 9 the binary and ternary alloy systems and their properties are summarized.

The book is edited by Dr Roland W. Ohse and is published this year by Blackwell Scientific Publications Ltd, 1000 pp., price about US-\$120. ISBN 0 632 01447 4.

The Moon — our nearest neighbour?



The above drawing was one of several similar drawings which appeared in the August issue of *PAC (Pure and Applied Chemistry)*. A lunar crater or some other part of the Moon's landscape you might ask? The answer is no. It is, in fact, a three-dimensional drawing of the projection of the oxygen atom positions of the nearest neighbour water molecules around the sodium ion, Na^+ . The drawings are calculated from MD simulations of various salt solutions. What is MD I hear you ask? MD is the unofficial IUPACRONYM (see *CI*, Vol. 7, No. 4, p. 1, 1985) for molecular dynamics.

The drawings are included in a paper by Karl Heinzinger (FRG) entitled 'The structure of aque-

Chemistry International, 1985, Vol. 7, No. 5

ous electrolyte solutions as derived from MD (molecular dynamics) simulations'. The paper was one of several plenary and session lectures presented at the 7th International Symposium on Solute-Solute-Solvent Interactions held at the University of Reading, UK, 15–19 July 1985. Other papers included 'The physical chemistry of natural waters' by Frank Millero (USA); 'Local order due to electrostatic interactions' by Pierre Laszlo (Belgium); 'Solvent effects on reaction rates' by Michael Abraham (UK); 'Insights into solute-solute-solvent interactions from transport property measurements with particular reference to methanol-water mixtures and their constituents' by L. A. Woolf (Australia) and 'Theories of transport properties using the Onsager treatment' by Jean-Claude Justice (France). All these papers appear in the *PAC*, Vol. 57, No. 8, August 1985.

RECENT REPORTS

In this section we publish summaries of the most recent IUPAC Recommendations on Nomenclature and Symbols and Technical Reports. The full texts of these recommendations and reports are published in *PAC*.

General aspects of trace analytical methods: Part VI. Trace analysis of semiconductor materials — Part A: Bulk analysis

The characterization of trace elements in semiconductor materials belongs to the most challenging tasks for analytical chemistry. This paper gives a critical evaluation of the most important methods for bulk analysis of silicon, germanium and gallium arsenide. Decomposition, preconcentration and determination methods (atomic emission and absorption spectrometry, spark source mass spectrometry, neutron activation analysis, electrochemical techniques, gas chromatography — mass spectrometry and others) are discussed mainly in respect to their information content and figures of merit.

General aspects of trace analytical methods: Part VII. Trace analysis of semiconductor materials — Part B: Distribution analysis

The analytical characterization of semiconductors is one of the most challenging tasks of analytical chemistry. Within this field quantitative distribution analysis of trace components, particularly of the dopant elements, is of great importance. For this purpose a variety of complementary techniques are at the disposal of the analytical chemist: electrical and magnetic measurements, infrared and luminescence methods, SIMS, RBS, NAA, CPAA, PIXES and EPMA. In this report the analytical figures of merit of these techniques are critically

evaluated. Then the most important method for quantitative distribution analysis, SIMS, is discussed in more detail.

These two reports were prepared by the Commission on Microchemical Techniques and Trace Analysis (V.2). Part A was published in *PAC*, Vol. 57, pp. 1133–1152 (1985) and part B in pp. 1153–1170, of the same issue.

IUPAC creature

The creature is, in fact, 2, 2, 4, 4, 6, 6, 10, 10, 12, 12, 14, 14 - dodecamethyl - 2, 4, 7, 8, 10, 12, 14 - heptasila - 1, 3, 5, 7, 9, 11, 13, 15 - octaoxaspiro [7, 7] pentadecane. This rare species has few friends and has yet to receive a common name. Any offers? It was spotted on p. 103 of the IUPAC publication *Organosilicon and Bioorganosilicon Chemistry: Structure, Bonding, Reactivity and Synthetic Application* (for details see *CI*, No. 3, p. 42, 1985). A healthy specimen was also seen crawling through p. 104 of the same book. The healthy specimen has only two methyl groups attached to the right-hand silicon whereas the sick specimen shown on p. 4 of this issue has three. Pentavalent silicon!

Mendeleev and the periodic classification

International Newsletter on Chemical Education, No. 22, December 1984. This issue is devoted to a milestone in the development of chemistry, namely the periodic classification. It commemorates the 150th anniversary of the birth of Dmitri Mendeleev. There are three articles on aspects of periodicity. A paper by Academician Yu A. Ovchinnikov (USSR) presents views on the life and works of Mendeleev. Bernadette Bensaude-Vincent (France) centres her contribution on the philosophical aspects of the discovery of the periodic classification and an article by Prof. G. T. Seaborg (USA) describes the transuranium elements and their future uses.

There are also articles on 'Teaching chemistry in a tertiary level open-learning system in a non-conventional approach' by Nava Ben-Zvi (Israel); 'Redesign of Introductory Organic Laboratory Programs: The Microscale Approach' by D. W. Mayo *et al.* (USA); 'The National Conference of The Chemical Education Division of The Royal Australian Chemistry Institute' by J. Devenport (Australia); 'Science for Handicapped Pupils' by A. V. Jones *et al.* (UK) and 'School Science Equipment: A review' by P. E. Childs (Ireland).

OTHER PUBLICATIONS

The International Programme on Chemical Safety (IPCS)

The IPCS is a joint venture of the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), and the World Health Organization (WHO). The main objective of the IPCS is to carry out and disseminate evaluations of the effects of chemicals on human health and the quality of the environment. Supporting activities include the development of epidemiological, experimental laboratory, and risk-assessment methods that could produce internationally comparable results, and the development of manpower in the field of toxicology. Other activities carried out by IPCS include the development of know-how for coping with chemical accidents, coordination of laboratory testing and epidemiological studies, and promotion of research on the mechanisms of the biological action of chemicals.

The IPCS has produced a series of reports entitled *Environmental Health Criteria*. Each report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of UNEP, the ILO, or

the WHO.

The titles available in the series include:

1. Mercury
2. Polychlorinated Biphenyls and Terphenyls
3. Lead
4. Oxides of Nitrogen
5. Nitrates, Nitrites and N-Nitroso Compounds
6. Principles and Methods for Evaluating the Toxicity of Chemicals, Part 1
7. Photochemical Oxidants
8. Sulfur Oxides and Suspended Particulate Matter
9. DDT and its Derivatives
10. Carbon Disulfide
11. Mycotoxins
12. Noise
13. Carbon Monoxide
14. Ultraviolet Radiation
15. Tin and Organotin Compounds
16. Radiofrequency and Microwaves
17. Manganese
18. Arsenic

19. Hydrogen Sulfide
20. Selected Petroleum Products
21. Chlorine and Hydrogen Chloride
22. Ultrasound
23. Lasers and Optical Radiation
24. Titanium
25. Selected Radionuclides
26. Styrene
27. Guidelines on Studies in Environmental Epidemiology
28. Acrylonitrile
29. 2,4-Dichlorophenoxyacetic Acid (2,4-D)
30. Principles for Evaluating Health Risks to Progeny Associated with Exposure to Chemicals during Pregnancy
31. Tetrachloroethylene
32. Methylene Chloride
33. Epichlorohydrin
34. Chlordane
35. Extremely Low Frequency (ELF) Fields
36. Fluorine and Fluorides
37. Aquatic (Marine and Freshwater) Biotoxins
38. Heptachlor
39. Paraquat and Diquat
40. Endosulfan

The titles are published under the joint sponsorship of the UNEP, ILO and WHO by the World Health Organization, 1211 Geneva 27, Switzerland.

Sentinel: Health and Environmental International Vol. 1, No. 3, April 1985. This issue contains a report of an IPCS workshop in SE Asia concerning chemical safety in developing countries. There is also an article on WHO and UNEP cooperation in combatting waterborne health hazards and another on fluorine and fluorides.

Environment Liaison Centre (ELC)

Ecoforum, Vol. 10, No. 1, February 1985. This is the journal of the ELC. The ELC is a non-governmental organization (NGO) serving a global network of NGOs in a working relationship with the United Nations Environmental Programme (UNEP). Current activities are supported by core funding from UNEP, the Canadian International Development Agency (CIDA), The Dutch Government and Government of France. Support for specific projects has been given by the European Economic Community (EEC), the Ford Foundation, the United States Agency for International Development (USAID), The Spirit of Stockholm Foundation, UNESCO and the Swedish International Development Authority (SIDA).

This issue contains a report of a Global Meeting on Environment and Development for NGOs held in Nairobi, Kenya in February this year. Participants at the Global Meeting called for a 'Bhopal Day' to be observed on the 100th day of the tragedy, 12th March, to mobilize international opinion on prevention of future industrial disasters and focus attention on the continuing plight of the Bhopal victims.

Chemistry International, 1985, Vol. 7, No. 5

Ecoforum, news alert, Vol. 2, No. 3, May 1985. This is a World Environment Day special. World Environmental Day was 5th June, the date on which the 'Dirty Dozen' Campaign was launched. This Campaign is an international public education and media effort which, by selecting 12 extremely hazardous pesticides in world trade, aims to highlight the many often unavoidable threats pesticides pose to human and environmental health globally.

All enquiries about ELC should be addressed to ELC, PO Box 72461, Nairobi, Kenya.

International Organization for Standardization (ISO)

KWIC Index of International Standards

This Key-Word-In-Context (KWIC) index is intended to meet the need for a single, comprehensive reference source that helps to identify all existing international standards for a given subject.

ISO Catalogue 1985

The 1985 ISO Catalogue contains a list of all ISO standards published up to 31 December 1984. The standards are presented by technical committee (TC) order and numerical order. In addition, there is a subject index, a Universal Decimal Classification (UDC) index and a list of standards withdrawn.

ISO Memento 1985

The ISO Memento, published annually, provides information in English and French on the scope of responsibility, organizational structure, and secretariats for each ISO technical committee. A Russian version is available as a separate publication. In addition, the Memento contains general information on the organization and administration of the work of ISO.

The end results of the ISO technical activity — the International Standards — are listed in the ISO Catalogue, published annually.

The address of the ISO Central Secretariat is: 1, rue de Varembe, Case postale 56, CH-1211 Genève 20, Switzerland.

ISO Bulletins 1985

These are published monthly. They include features, and also sections on ISO at work, International Standards in process, ISO news, publications, conferences. No. 4 (April) features coal; No. 5 (May) cork (as in bottles — not as in Ireland); No. 6 (June) sport and No. 7 (July) paints and varnishes, assessment of quality systems and standards in developing countries.

Chamberlain's law:

'Everything tastes more or less like chicken.'
From: *C&EN*, September 3, 1984, p. 40.

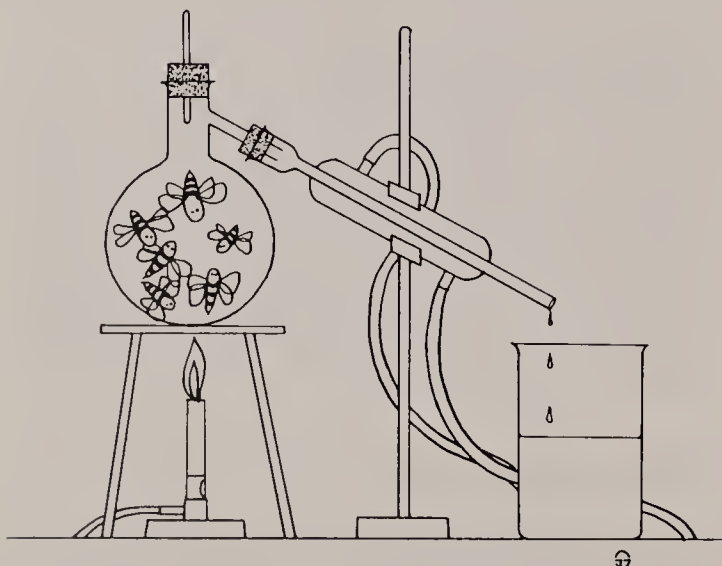
UNESCO

UNESCO Statistical Yearbook 1984. This is the 21st edition of the book. It contains 1068 pages and 130 tables. These present world-wide trends and information concerning 200 countries and territories. The book can be obtained from national distributors of UNESCO publications or from the UNESCO Press, Place de Fontenoy, 75700 Paris, France. Trilingual English/French/Spanish FF300/£45/\$75.75. It is also available on microfiche.

Natural products: what they mean in everyday life

Impact of science on society, Vol. 34, No. 4, 1984. This Unesco publication appears not only in English and French, but also in Chinese, Russian and Korean. This particular issue is devoted to the chemistry of natural products. It is introduced by Prof. Glen T. Seaborg, winner of the Nobel Prize in Chemistry (1951). He is also the first president of the International Organization for Chemical Sciences in Development (IOCD). The issue contains papers by specialists from both developing and industrialized countries describing their work on the chemistry of natural substances and its economic and social significance.

Huang Liang and Zhou Jin describe recent trends in drug research in China. Antonio Gonzales G. and two other chemists from the Canary Islands explain how nature mimicks the production of terpenoids. In another paper, Nitya Anand, an Indian medicinal chemist, recounts the efforts of his countrymen to develop substances of agricultural and other uses from his country's 20 000 species of plants. Three specialists from Chile survey the range of research in natural products chemistry. There is also a paper by three authors from the Bulgarian Institute of Organic Chemistry who describe the practical value of polyphenols taken from propolis, a natural wax-like substance made by bees.



International Council of Scientific Unions (ICSU)

ICSU Newsletter No. 21, March 1985. This issue reports on the decisions taken at the 43rd meeting of the ICSU Executive Board; ICSU Ringberg Conference and ICSU's Committee on Science and Technology in Developing Countries (COSTED)

ICSU Newsletter No. 22, June 1985. This contains reports on Biomass; Scientific Results of Recent Quaternary Studies (INQUA), Science and Technology for Development (COSTED) and SCOSTEP's STETS programme. SCOSTEP is ICSU's Scientific Committee on Solar Terrestrial Physics and STETS stands for Solar-Terrestrial Energy Transfer Studies.

ICSU Yearbook 1985

ICSU is an international non-governmental scientific organization composed of 20 international Scientific Unions (of which IUPAC is one), 66 National Members, 19 Scientific and 5 National Associates. This book gives the names and addresses of all these organizations and the key people within them. The three-and-a-half pages devoted to IUPAC include the names of all the standing committees, divisions and commissions and their chairmen and secretaries. The yearbook also contains the full report of the ICSU Secretary General for 1984.

The book (ISSN 0074-4387) is published by the International Council of Scientific Unions, 51 Boulevard de Montmorency, F-75016 Paris, France.

International Federation of Clinical Chemistry (IFCC)

IFCC News, No. 39 1985/1. This issue contains news of the 'new' IFCC. This includes new statutes and a new official logo of the Federation. There are also two articles on training and education in Latin-American, African, Mediterranean, and Near-East countries and an article on Ethics in Clinical Chemistry in addition to a number of Scientific Committee Reports and details of IFCC Congresses and Courses.

Committee on Science and Technology in Developing Countries (COSTED)

Science, Technology and Development, Vol. 9, No. 1, Spring 1985. The COSTED News Bulletin now has a new more colourful look. In this issue there is an article on Chemistry and the Environment and another on Atmospheric Pollution and the Environment. COSTED is an ICSU committee and its bulletin is published with financial support from UNESCO. For further details of COSTED write to: The Scientific Secretary, COSTED, Department of Physics, Indian Institute of Technology, Madras 600 036, India.

What's in a name?

Gen and the halogens

With the exception of fluorine the names of the halogens derive from Greek words:

name	origin	meaning
halogen	<i>hals</i> (Gk)	salt
	<i>gen</i> (Gk)	producing
fluorine	<i>fluere</i> (L and F)	flow or flux. (Until AD 1500 the mineral fluorspar CaF_2 was used as a flux in metallurgy)
chlorine	<i>chloros</i> (Gk)	greenish yellow
bromine	<i>bromos</i> (Gk)	stench
iodine	<i>iodes</i> (Gk)	violet
astatine	<i>astatos</i> (Gk)	unstable

(F = French: Gk = Greek: L = Latin)

The syllable *gen* occurs as a prefix or suffix in numerous scientific terms, for example, hydrogen, oxygen, nitrogen, gene, generator, and antigen. It is normally associated with growth or production. For example halogen (= *hal* + *gen*) means salt producing. Oxygen (= *oxy* + *gen*) means acid producing. *Oxy* derives from the Greek word *oxus* meaning sharp. The Greek word *genes* means born. Similar words also

occur in Old French (*genre/gendre*) and Latin (*genus*). These words mean kind, type or class.

The *gen* in geneva has a completely different origin however. Geneva is a spirit distilled from and flavoured with juniper berries. The word derives from the Old French word *genevre* and Latin word *juniperus*. The alcoholic beverage gin also has the same origin.

World Resources Institute

Journal '85. This journal is published annually. It records the progress of the World Resources Institute (WRI) by reporting its principal activities and its cooperative efforts with other organizations. The WRI's six fields of study are: the conservation of biological resources; sustainable agriculture; energy and climate; pollution and health; institutions and governance, and resources and environmental information. The journal publishes excerpts from WRI's publications and highlights from the institute's conferences, seminars and other meetings. Included in this issue are essays on 'What has to be done to prevent more Bhopals'; 'Once is too often — corporate responsibility in the aftermath of Bhopal' and 'Community biogas plants: social catalyst or technical fix?'.

FORGET ABOUT THE HALO —
WHAT ABOUT THE GEN !?



IUPAC-SPONSORED CONFERENCES

6th International Congress of Pesticide Chemistry Ottawa, Ontario, Canada, 10–15 August 1986

The scientific meetings of the Congress will be held in the Ottawa Congress Centre.

The scientific programme of this Congress is intended to emphasize the various roles of chemistry in pesticide science, ranging from chemical synthesis to hazard assessment.

The plenary lectures will be given following the opening ceremony. They will reflect on the importance of pesticides in food production and health protection for Mankind. The speakers will address these topics from the point of view of the roles of chemistry and biotechnology. The programme includes eight main topics, which deal with synthesis, natural products, formulations, analysis, metabolism, environmental fate, toxicology, biochemistry and mode of action of pesticides. There will also be a forum on various aspects of the regulation of pesticides. Each main topic will consist of a symposium, which will present an overview of problems, and project the future direction of research in that area, as seen by the invited experts. There will also be poster/workshop sessions.

The proceedings will be published as a single volume. It will contain the plenary and symposia presentations and invited poster papers together with a synopsis of the workshop.

Subject to final confirmation, the registration fee will be approximately \$200.00 Canadian. Accommodation will be primarily in the Westin Hotel, a new first class hotel immediately adjacent and connected to the Congress Centre. Accommodation will also be available in a residence of the University of Ottawa.

The working language of the Congress is English and the presentation of papers in this language is recommended. No simultaneous translation will be provided.

The Ottawa Congress Centre was first opened in 1983, and is centrally located, within easy walking distance of downtown hotels. Ottawa is an Algonquin Indian word, which was adopted by the city in 1854. Sited at the confluence of the Gatineau, Ottawa and Rideau rivers, Ottawa served as a starting point for exploration of the hinterland of North America by the early settlers. The lakes, forest and hills close to Ottawa enhance the natural ambience of the city, while its bilingual character, reflecting the cultures of Canada's two founding nations, further enriches the life in this New World capital. Ottawa, which currently has a population of approximately 600 000, is also the location of many of the Federal Government research laboratories.

Mid-August in Ottawa is a delightful period, with temperatures normally ranging in the upper 20s during the daytime and low in the mid-teens at night.

2nd International Symposium on Biological Reference Materials: Neuherberg, Munich, FRG, 24–25 April 1986

This Symposium will be held in the Conference Building of the GSF at Neuherberg. It immediately follows the 4th International Workshop on 'Trace element analytical chemistry in medicine and biology'.

The Symposium aims to focus on the study of certified and uncertified biological reference materials useful in the improvement of methods in the fields of clinical, environmental and nutrition analysis. There will be about 20 plenary lectures by invited speakers.

The conference language is English. The participant registration fee, which covers attendance at the Symposium, Conference Abstracts and various activities is DM 50. The preliminary programme will be announced in the second circular which will be issued in November.

1st International Symposium on Organic Chemistry in Technological Perspective: Jerusalem, Israel, 1–6 June 1986

The purpose of the Symposium is to discuss current and future processes for the production of organic chemicals and review recent developments in this field. Emphasis will be placed on the chemistry, economics and environmental impact, rather than the engineering aspects involved.

The Symposium will include plenary lectures presented by leading experts, contributed papers, poster sessions and workshops on selected topics. The topics to be covered are:

- Petrochemical and C-1 processes
- Solvent-extraction assisted processes
- Catalytic processes (homogeneous, heterogeneous, phase-transfer, enzymatic, etc.)
- Electrochemical and photochemical processes
- Processes via polymeric reagents
- Economic implications of future organic processes.

The conference language will be English. Hotel accommodation at various rates is readily available in the conference area. The conference registration fee is expected to be US-\$160.00.

5th International Symposium on Ring-opening Polymerization: Blois, France, 22–26 June 1986

The scientific sessions of the Symposium will be held in the great hall of "Aile Gaston d'Orleans" in the Renaissance Castle of Blois, located in the centre of the City of Blois.

The programme will include 15 invited lectures, plus contributed papers, some to be presented orally and others in poster sessions. The Symposium will deal with various aspects of ring-opening polymerizations and with the corresponding polymers. The following topics have been selected:

Polymerization of heterocycles and cycloolefins:
kinetics and mechanisms

New polymers: tailor-made polymers and copolymers

Industrial polymers, biomedical polymers and pharmaceutical materials

Syntheses and applications

Structure and physical properties of the polymers.

A round-table concerned with macrocyclic compounds is also planned.

English and French are the official languages for presentation of contributions. The number of participants will be limited to approximately 150 and registrations will be accepted in the order of receipt.

The registration fee will be US-\$150 for scientific participants and US-\$50 for students. Accommodation for participants will be arranged in hotels of various classes in Blois.

Blois is a Royal City located 150 km south-west from Paris in the famous Renaissance castle region. It is a charming town built on the left bank of the Loire river with agreeable promenades through streets with old houses and restaurants with typical food and wine of the Loire region. The Castle of Blois, called the "Versailles of the Renaissance", includes Feudal, Renaissance and Classical parts. It includes the famous 16th century Renaissance staircase. A "light and sound" spectacle which describes the story of the castle is scheduled in the programme. The participants will have the opportunity to visit several other famous castles close to Blois, including the castles at Chambord, Cheverny, Beaugard and Chaumont.

The weather at the end of June in this region is warm and agreeable.



The Castle of Blois.



The "Renaissance Staircase" at Blois.

SAC International Conference on Analytical Chemistry Bristol, UK, 20–26 July 1986

The SAC 86 International Conference on Analytical Chemistry will be held at the University of Bristol. The initials SAC stand for the former Society of Analytical Chemistry which initiated these conferences. The Conference is to be combined with the Biennial National Atomic Spectroscopy Symposium (BNASS), organized by the Atomic Spectroscopy Group of the Analytical Division of the Royal Society of Chemistry and the Spectroscopy Group of the Institute of Physics.

The scientific programme will be organized around plenary, invited and contributed papers and posters covering the whole field of analytical chemistry, and all aspects of atomic spectroscopy. The programme will include workshops, where research workers can demonstrate new apparatus and techniques. Update courses are also planned, to provide all-day tutorial and practical demonstration sessions.

The University of Bristol is situated a few minutes walk from the City Centre which has excellent road, rail and air links with London and the rest of the UK. Accommodation will be provided in University Halls of Residence 10–15 minutes drive from the University; buses will be provided. Only single rooms are available.

Delegates may register for the whole week which will include either the BNASS sessions or the SAC sessions held on Thursday and Friday. There will be a special three-day registration to allow participants to register for the BNASS part of the Conference. One and two day registration (for the SAC sessions) will be available to members of the participating bodies.

An exhibition of commercial apparatus, equipment and books will be a feature of the Conference. A wide-ranging programme of tours and visits, arranged for participants, will give a taste of the wealth of historic sites, contrasting scenery and varied natural history to be found in both City and surrounding countryside. This will include the Avon Gorge, SS *Great Britain*, Cheddar Caves, Strawberry Fields and Roman Baths.

10th International Conference on Non-aqueous Solutions Leuven, Belgium, 17–21 August 1986

The Conference will be held in the Science Buildings of the University of Leuven, Belgium. Plenary and invited session lectures will be presented on all the following topics:

- Theory and thermodynamics of non-aqueous solutions
- Transport and conductance properties of non-aqueous solutions, both experimental and theoretical
- Spectroscopic and structural aspects
- Kinetics, electrochemical and preparative problems involving non-aqueous solutions
- Water in non-aqueous solutions.

The official language of the Conference will be English. No translation facilities will be available.

Accommodation for participants and accompanying guests will be available in the Student City of the University in single or double rooms. This is situated in a parkland area about a few hundred metres away from the lecture rooms, and two kilometres from the centre of the beautiful old city of Leuven. Breakfast and dinner are served in the University Restaurant. Lunches will be provided in the lecture building. Children are allowed to be lodged in the Student City. It is anticipated that the total cost of attendance at the Conference including registration fee (400 BF), accommodation, all meals, excursion and conference banquet will be about 13 000 BF.

Leuven is situated about 25 kilometres east of Brussels, 15 kilometres from Brussels airport. Other towns in Belgium which are of interest are Brussels, Antwerp, Ghent, Namur. The beautiful hill region of the Ardennes is about one hour by car to the south-east. A Conference Tour will be organized on Wednesday 20 August and will visit the medieval cities of Bruges and Damme.

15th International Symposium on the Chemistry of Natural Products The Hague, Netherlands, 17–22 August 1986

The Symposium will be held in the International



The medieval Castle of Arenberg, Heverlee.

Netherlands Congress Centre at The Hague. It will include plenary lectures and contributed papers.

The scientific programme of the Symposium is intended to cover all aspects of natural product chemistry. A mini-symposium will be devoted to the chemistry of β -lactams. The main programme will highlight the following themes:

- Structure, chemistry and synthesis of natural products
- Organic chemistry as a life science
- Biopolymers and their components
- Mini-symposium: Chemistry and development of new generation of β -lactams.

In addition, there will be 16 invited half-hour section lectures.

Contributed Papers: There will be opportunity for oral presentation and poster presentation.

The official language of the Symposium will be English. There will be no arrangement for translation.

Accommodation has been reserved in a number

of hotels of categories varying from deluxe to simple facilities.

The Hague (in Dutch *Den Hag* or '*s-Gravenhage*') is situated on the North Sea coast; Scheveningen is its famous seaside resort. Some sights and attractions: the Pier at Scheveningen, the House of Parliament, the city centre with terraces and shopping areas, the miniature village Madurodam, the many museums with famous art collections like the Mauritshuis and the Panorama Mesdag Museum, the casino housed in the Kurhaus Hotel, the many antique shops and markets, the parks and palaces. The Hague is also both the Royal Residence and the seat of Government. The International Court of Justice (Peace Palace) is symbolic of the international character of the city.

Amsterdam and Rotterdam, and the historic towns Delft and Leiden, are all at very close distance and conveniently reached by train or bus. The Hague is also a good starting point for numerous interesting excursions.

CONFERENCE CALENDAR

1985

Medicinal Natural Products

10–14 November. International Symposium on Organic Chemistry of Medicinal Natural Products. Shanghai, China.

(Prof. Wang Yu, Chairman, Organizing Committee, International Symposium on Organic Chemistry of Medicinal Natural Products (IUPAC), 345 Lingling Lu, Shanghai 200032, China.)

Chemistry International, 1985, Vol. 7, No. 5

1986

Chemical Resources of the Ocean

24–29 March. CHEMRAWN IV: The Global Ocean — Its Chemistry and Resources. Woods Hole, Massachusetts, USA.

(CHEMRAWN IV Coordinating Office. Oceanography Program, The University of Michigan, 2455 Hayward Avenue, Ann Arbor, Michigan 48109-2143, USA.)

Biological Reference Materials

24–25 April. 2nd International Symposium on Biological Reference Materials. Neuherberg, Munich, FRG.

(Dr M. Stoeppler, Institut für Chemie der Kernforschungsanlage, Jülich GmbH, Institut 4: Angewandte Physikalische Chemie, Postfach 1913, D-5170 Jülich 1, Federal Republic of Germany.)

Organic Chemistry in Technological Perspective

1–6 June. 1st International Symposium on Organic Chemistry in Technological Perspective. Jerusalem, Israel.

(Prof. D. Vofsi, The H. Levine Center for Industrial Research, Weizmann Institute of Science, Rehovot 76100, Israel.)

Ring-Opening Polymerization

22–26 June. 5th International Symposium on Ring-Opening Polymerization. Blois, France.

(Dr N. Spassky, Laboratoire de Chimie Macromoléculaire, Université Pierre et Marie Curie, Tour 44, 4 place Jussieu, F-75230 Paris Cédex 05, France.)

Synthetic Polymeric Membranes

7–10 July. 29th Microsymposium on Macromolecules. Prague, Czechoslovakia.

(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Crosslinked Epoxides

14–17 July. 9th Discussion Conference on Macromolecules. Prague, Czechoslovakia.

(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Analytical Chemistry

20–26 July. SAC 86: International Conference on Analytical Chemistry. Bristol, UK.

(The Secretary, Analytical Division, Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Organic Synthesis

10–15 August. Sixth International Conference on Organic Synthesis. Moscow, USSR.

(Prof. N. K. Kochetkov, N.D. Zelinsky Institute of Organic Chemistry, Academy of Sciences of the USSR, Leninsky prospect 47, SU-117913 Moscow B-334, USSR).

Pesticide Chemistry

10–15 August. 6th International Pesticide Chemistry Congress. Ottawa, Canada.

(The Chemical Institute of Canada, 151 Slater

Street, Suite 906, Ottawa, Ontario, Canada K1P 5H3.)

Solubility Phenomena

12–15 August. 2nd International Symposium on Solubility Phenomena, Newark, New Jersey, USA.

(Dr M. Salomon, Symposium Co-Chairman, PO Box 254, Fair Haven, New Jersey 07701, USA.)

Non-aqueous Solutions

17–21 August. 10th International Conference on Non-aqueous Solutions. Leuven, Belgium.

(Dr G. Maes, Department of Chemistry, University of Leuven, Celestijnenlaan 200F, B-3030 Heverlee, Belgium.)

Natural Products

17–23 August. 15th International Symposium on the Chemistry of Natural Products. The Hague, Netherlands.

(Dr G. J. Koomen, Secretary, 15th IUPAC International Symposium on the Chemistry of Natural Products, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, Netherlands.)

Physical Organic Chemistry

24–29 August. 8th IUPAC Conference on Physical Organic Chemistry, Tokyo, Japan.

(Prof. M. Ōki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

Coordination Chemistry

24–29 August. 24th International Conference on Coordination Chemistry. Athens, Greece.

(Dr Ersi Vrachnou-Astra, Department of Chemistry, Nuclear Research Center 'Demokritos', 153 10 Aghia Paraskevi, Athens, Greece.)

Raman Spectroscopy

31 August–5 September. 10th International Conference on Raman Spectroscopy. Eugene, Oregon, USA.

(Prof. Warner L. Peticolas, Department of Chemistry, University of Oregon, Eugene, Oregon 97403-1210, USA.)

1987

CHEMRAWN VI

17–22 May. CHEMRAWN VI. World Conference on Advanced Materials Needed for Innovations — Energy, Transportation and Communications. Tokyo, Japan.

(Mr H. Hamada, Executive Director, The Chemical Society of Japan, 1–5 Kanda-Suragadai, Chiyoda-ku, Tokyo, Japan.)

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 - What natural products mean in everyday life
 - Sound and its perception
 - Creativity and innovation in the arts and sciences
 - Remote sensing of the planet
 - High technology, the multinationals and developing countries
-

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STANDARD POTENTIALS IN AQUEOUS SOLUTION

(Monographs in Electroanalytical Chemistry and Electrochemistry Series, Volume 6)*

edited by **Allen J. Bard**, *University of Texas, Austin*, **Roger Parsons**, *Laboratoire d'Electrochimie Interfaciale du CNRS, Meudon, France*, and **Joseph Jordan**, *The Pennsylvania State University, University Park*

August, 1985
824 pages, illustrated
\$29.95

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- ...useful oxidation-state diagrams

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IUPAC

Enthalpies of Vaporization of Organic Compounds

A Critical Review and Data Compilation

Chemical Data Series No. 32

V. Majer and V. Svoboda *Dept of Physical Chemistry, Institute of Chemical Technology, Prague, Czechoslovakia*

This databook results from a project of the IUPAC Subcommittee on Thermodynamic Tables coordinated by **H.V. Kehiaian**. The purpose of the project was to collect and critically evaluate all calorimetrically determined data on the enthalpy of vaporization ΔH_v of organic compounds, to generate a set of recommended values, and to evaluate standard enthalpies of vaporization and cohesive energies. Every effort was made to furnish maximum amount of information on the origin of experimental data, their reliability and consistency, experimental techniques and the data treatment. Besides the recommended values with accuracy estimates, the tables list all the direct experimental values with relevant comments. Main applications of enthalpies of vaporization in thermodynamics and chemical engineering are discussed and also included is a survey of calorimetric techniques which have been used to determine ΔH_v .

The data compilation includes the following

- It presents all available enthalpy of vaporization data determined by calorimetric means since 1932.
- The recommended values of ΔH_v are listed for 298.15 K and the normal boiling temperature. The temperature dependence of the enthalpies of vaporization described in terms of correlating equations and the parameters are tabulated.
- Based on the recommended values for ΔH_v , calculated values are listed for the standard enthalpies of vaporization at 298.15 K, and for the cohesive energies at 298.15 K and the normal boiling temperature. Also included are the parameters describing the temperature dependence of the cohesive energies.

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Handbook of Thermodynamic and Transport Properties of Alkali Metals

Edited by Dr Roland W. Ohse, Commission of the European Communities, Joint Research Centre, Karlsruhe Establishment, Karlsruhe, Federal Republic of Germany

The purpose of this *Handbook* is to summarize and assess the vast amount of available data and to provide both the practicing engineer and basic research worker with current knowledge on structural, thermodynamic and transport properties of alkali metals. In order to guarantee a comprehensive and up-to-date survey of the field, an international team of ca. eighty leading scientists from throughout the world was invited to assess their own specialization as it applies to alkali metals.

The first two sections of the *Handbook* cover the basic relationships and theory of liquid metals, including the latest developments in model approaches and computer simulation, and provide the necessary background and present status. Section 3 on technological applications summarizes the various applications of alkali metals in modern technologies. Section 4 gives a complete survey of the existing techniques of high-purity preparation and its analytical aspects. A special chapter is devoted to safe handling. The structural, thermodynamic and transport properties and their methods of evaluation are critically assessed in sections 5 to 7. Solutions of non-metals in alkali metals are treated in section 8, and in section 9 the binary and ternary alloy systems and their properties are summarized.

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Chemistry International

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The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary, non-governmental, non-profit association of organizations, each of which represents the chemists of a member country.

Its objectives are:

to promote continuing co-operation among the chemists of the member countries;

to study topics of international importance to pure and applied chemistry which need regulation, standardization, or codification;

to co-operate with other international organizations which deal with topics of a chemical nature;

to contribute to the advancement of pure and applied chemistry in all its aspects.

The membership of IUPAC presently comprises 44 countries, each represented by a national organization, such as an academy of science or research council.

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Chemistry International

The news magazine of the International Union
of Pure and Applied Chemistry (IUPAC)



IXON

Rendez-vous with chemistry!



CHEMISTRY INTERNATIONAL

The news magazine of the International Union of Pure and Applied Chemistry (IUPAC)

EDITOR: Michael Freemantle
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Front cover: Scenes from the General Assembly, Lyon.

The international chemical bond

I wonder if anyone has ever assessed the benefits of international scientific meetings? There are certainly cynics who complain that such meetings are often no more than 'talk shops' where scientists get together just to have a good time at someone else's expense.

The purpose of the IUPAC General Assembly is fairly obvious to those involved. Council, Bureau, Committees and Commissions meet to engage in various activities. For example, Officers are elected, budgets finalized and accepted or rejected, future directions and policy of the Union are determined, new projects are planned and the progress of ongoing projects reviewed. The emphasis is on work. When those involved in the various IUPAC component bodies can all get together at the same time more can be achieved — and is achieved — in the space of a few days than can be achieved in months of dispersed activity.

Chemistry congresses and symposia are different. Here chemists gather together to hear experts report on their latest findings and review progress in their specialized fields. During question times, coffee breaks and lunches and on social occasions views are exchanged, theories probed and explanations clarified. Young chemists who attend are often inspired by coming into contact with eminent chemists at these meetings. Older chemists go back to their laboratories with fresh ideas and their batteries recharged.

These are some of the overt benefits of international chemistry meetings. Yet there are also hidden benefits. Where else can you find people from such a diversity of social, economic and political backgrounds gathering to work and talk together? And the topic that unites them is *chemistry*. It is perhaps worthwhile, at this point, to state the first and last objectives of the Union, as defined by its statutes.

S2.1 To promote continuing cooperation among the chemists of the member countries;

S2.5 In pursuing these objects the Union will observe the basic policy of political non-discrimination and affirms the rights of chemists of any country to adhere to or to associate with international activity in the field of chemistry without regard to race, religion, or political philosophy.

IUPAC may thus be regarded as providing an *international chemical bond* between people of all races, religions and political philosophy. This thought was echoed by Dr Schneider in his 'State of the Union' report at Lyon. "The principal business of IUPAC, and in fact its 'raison d'être' must continue to be highly significant scientific activities carried out through active international cooperation and collaboration" (see *CI*, No. 5, p. 23, 1985). Our new President, Prof. Rao, has also emphasized the importance of international meetings in fostering cooperation — particularly with scientists in developing countries. "Scientists need to participate in various activities to feel part of the international community. International meetings are also very important from a professional point of view to exchange ideas and meet fellow scientists. This is much more important for scientists in a developing country than in the developed nations of the West" (see *CI*, No. 4, p. 19, 1985).

It is perhaps noticeable and certainly welcome to see the increased involvement of scientists from Third World countries in international scientific meetings and it must be encouraging to scientists in the Third World that IUPAC should now have a President who is an eminent Indian chemist and who is a Founding Fellow of the Third World Academy of Sciences.

New Chairman of Hungarian National Committee

On 19 April this year, Prof. G. Schay resigned as Chairman of the Hungarian National Committee for IUPAC. The new Chairman is Prof. E. Pungor.

Prof. Géza Schay was Chairman of the Hungarian Committee from 1957–85 and an active member of the Commission on Colloid and Surface Chemistry including Catalysis (I.6). In particular, he helped prepare Appendix II of the *Manual of Symbols and Terminology for Physico-chemical Quantities and Units*, Part I (Definitions, Terminology and Symbols in Colloid and Surface Chemistry) and Part II (Heterogeneous Catalysis). Although of Hungarian nationality, he was born on 26 May 1900 in Vienna, Austria. From 1929 to 1945 he was Lecturer in Physical Chemistry at the University of Budapest. He then became Director of the Hungarian Rubber Research Laboratory and Director of the Central Research Institute for Chemistry of the Hungarian Academy of Sciences, Budapest. His scientific interests include reaction kinetics, catalysis of hydrocarbon reaction, adsorption at gas–solid and liquid–solid interfaces and gas chromatography. He has published about 170 scientific papers, two more monographs and was co-author of a three-volume text book on theoretical physical chemistry.



Prof. G. Schay.



Prof. E. Pungor.

His successor, Prof. E. Pungor, has been involved with IUPAC since 1974. He is a Titular Member of the Commission on Electroanalytical Chemistry (V.5) and represents the Federation of European Chemical Societies (FECS) on the Analytical Chemistry Division (V) Committee. He was born on 30 October 1923. From 1962–70 he was Director of the Institute for Analytical Chemistry at the Chemical University of Veszprem. He is now Director of the Institute for General and Analytical Chemistry, Technical University, Budapest. He is also Chairman of the Analytical Chemistry Division of the Hungarian Chemical Society and since 1970 has been Head of the Analytical Group of the Hungarian Academy of Science. Prof. Pungor has received awards and distinctions from countries throughout the world including Czechoslovakia, Austria, Egypt, Finland, Japan, Peru and the UK. He is the author of over 400 papers and several books on analytical chemistry. In addition he is the editor of two scientific journals and a member of the editorial boards of nine others.

We regret to record the death of:

Prof. V. Gold, UK (29 September 1985) — Bureau (1985–), Organic Chemistry Division Committee (1985–), Commission on Physical Organic Chemistry (1973–), Interdivisional Committee on Nomenclature and Symbols (1979–).

Dr C. E. Rees, Canada (19 September 1984) — Commission on Atomic Weights and Isotopic Abundances (1983–85).

Dr E. Wichers, USA (27 January 1984) — President of Inorganic Chemistry Division (1955–59), Bureau (1959–61), Commission on Atomic Weights (1949–69).



Dr Edward Wichers.

DIVISION PRESIDENTS

The terms of office of six of the seven Division Presidents expired at Lyon this year. *CI* has already published pen-portraits of five of the six retiring Presidents.* To complete the picture and as a tribute to his many years of service to the Union we now publish a short pen-portrait of Dr H. Frehse who retired as President of Division (VI) this year.

Dr Helmut Frehse

Applied Chemistry Division

The scientific activities of Dr Helmut Frehse have been concerned mainly with the study of pesticides and their residues. In 1957 he became a residue chemist working for the Department of Pesticide Research of BAYER AG in Leverkusen, Federal Republic of Germany. He became Head of the Department in 1962. By 1970 he had become Head of the Institute for Metabolism Research and Residue Analysis and, in 1983, Head of the Institute for Product Information and Residue Analysis.

While working in Leverkusen Dr Frehse became actively involved in the affairs of IUPAC. In 1967 he joined the Pesticides Section (VI.5) and became a Titular Member of the Commission on Pesticide Residue Analysis (VI.5.2). He became Chairman of the Commission in 1973. In the same year he became a Titular Member of the Section Committee on Pesticides (VI.5). From 1975–78 he was Chairman of the Coordinating Committee on Pesticide Chemistry. This functioned as a continuation of the former Section VI.5. In 1975 he also became a Member of the Applied Chemistry Division Committee. He was President of the Division from 1981 until this year.



Born in Cologne, Germany, in 1927, Dr Frehse began his studies at the University there in 1946, earning a degree in chemistry and biology. In 1954 he was awarded a PhD in enzyme chemistry. He continued with research at the University as Scientific Assistant for the Institute for Fermentation and Enzyme Chemistry and

went on to work for the German Institute for Lipid Research in Münster.

As a member of the various bodies within IUPAC, Dr Frehse was regularly involved in international activities and interrelationships between various organizations such as the UN Food and Agricultural Organization (FAO) and the World Health Organization (WHO). For example, he has attended FAO/WHO Joint Meetings on Pesticide Residues since 1965 and was a regular representative (for IUPAC) to the FAO/WHO Codex Alimentarius Committee on Pesticide Residues. Dr Frehse is an author of

55 publications: 10 on plant enzymes and whey proteins (1953–57) and 45 on pesticide metabolism and analysis (1957 onwards). He is also the co-author of a book on pesticide residue analysis. He has been an active member of various organizations, including the Pesticides Commission of the German Research Society, the Panel on Ecochemistry of German Pesticides Manufacturers Association, of which he was Chairman, and the Residue Committee of GIFAP (the International Trade Association of National Associations of Agrochemical Manufacturers).

*President	Term	Division	Pen-portrait
Dr Mary Good	1979–85	Inorganic Chemistry (II)	<i>CI</i> , No. 2, p. 10, 1985
Prof. G. Modena	1983–85	Organic Chemistry (III)	<i>CI</i> , No. 5, p. 6, 1985
Prof. C. H. Bamford	1981–85	Macromolecular (IV)	<i>CI</i> , No. 3, p. 24, 1985
Prof. F. Pellerin	1981–85	Analytical Chemistry (V)	<i>CI</i> , No. 5, pp. 35–36, 1984
Prof. F. W. Sunderman Jr	1981–85	Clinical Chemistry (VI)	<i>CI</i> , No. 5, p. 36, 1984

Need for environmental toxicologists identified

One of the main purposes of the meeting of the Commission on Atmospheric Chemistry (VI.4) when it met at the National Centre for Atmospheric Research (NCAR), Boulder, USA 16–17 May 1985 was to discuss the work of the IUPAC Commission directly with R. Cicerone who is the Vice-Chairman of the Global Tropospheric Chemistry Panel and Director of the Atmospheric Chemistry Division, NCAR. R. Cicerone gave a brief outline of the reasons why the Panel was set up and stated the five main study areas of interest:

1. Biological sources
2. Photochemical transformations
3. Multiphase processes
4. Deposition and transportation
5. Modelling

One of the main concerns was the lack of good fundamental research databases, for example on gas solubility in water data. Acquisition of some of this data would necessitate extensive laboratory studies but would be of extreme value. However the Chairman emphasized that the principal objective of the Commission was to investigate and review current sampling and analytical programmes for atmospheric chemistry as a whole in close collaboration with appropriate international experts. Its principal role was standardization of research methods. It was therefore not appropriate for it to carry out any laboratory research itself.

One project (project 1, see *CI*, No. 4, p. 35, 1985) had been put forward by the Commission to review and evaluate current tropospheric chemistry sampling programmes. This was welcomed by R. Cicerone. The intention would be to

develop this information into a database consisting of researchers' names, publications, research areas, compounds studied, along with details of methodology used. The database would be of help to researchers entering the field for the first time (for example, Third World countries) who could then be put in touch with other institutions carrying out similar work and also to the Commission in relation to its other projects.

In addition to the meeting with R. Cicerone a meeting was set up with D. Albritton of the Environmental Science Research Laboratory, Boulder Co. One of the main points to come out of the discussions was the fact that many research teams on scientific expeditions often experienced difficulties with customs when travelling from one country to another. He wondered whether the IUPAC Commission could investigate these problems and develop some kind of basic protocol for potential experimenters to use prior to shipment or travel. This was agreed.

Projects

Project 1 was discussed at length. It was hoped that once the database was set up it would be subscribed to by research workers and that they would also be prepared to submit information sheets on their current research programmes. This would permit the Commission to keep an up-to-date overview of work world-wide and help put research groups carrying out similar work in touch with each other. Initially the information would be put on card indexes with a view to putting the data on to a computer.

Following on from this discussion it was suggested that it might be of value to prepare a glossary of terms commonly used and appropriate to atmospheric chemistry research. This could be used as a standard reference text for researchers during the preparation of papers for publication and presentation at conferences. This would be particularly helpful to research in Third World countries whose native tongue is not English but who are often required to present their work in English.

Another topic discussed was the potential for using diffusive sampling methods for measuring the concentration of tropospheric pollutants. Most of the work to date on the development of these sampling systems had been directed at establishing their effectiveness for use in the workplace although some environmental monitoring work had been carried out but at

'ground' level. Any extension of this sampling concept to tropospheric measurements will require much greater theoretical and practical studies on pressure and face velocity effects along with establishing the effectiveness of adsorbent/collection media at low pressures.

Further discussions indicated that there was probably a need to generate 'tropospheric toxicologists'. In the same way that industrial toxicology can and has been used to establish and predict whether a particular chemical substance is likely to be harmful to the workforce handling it, it should also be possible to use existing research data to predict the types of compound that may be used by industry in the future which could have potentially deleterious effects on the troposphere if uncontrolled emissions occur.

C. J. Purnell

Letter to the Editor

Views on IUPAC and *CI*

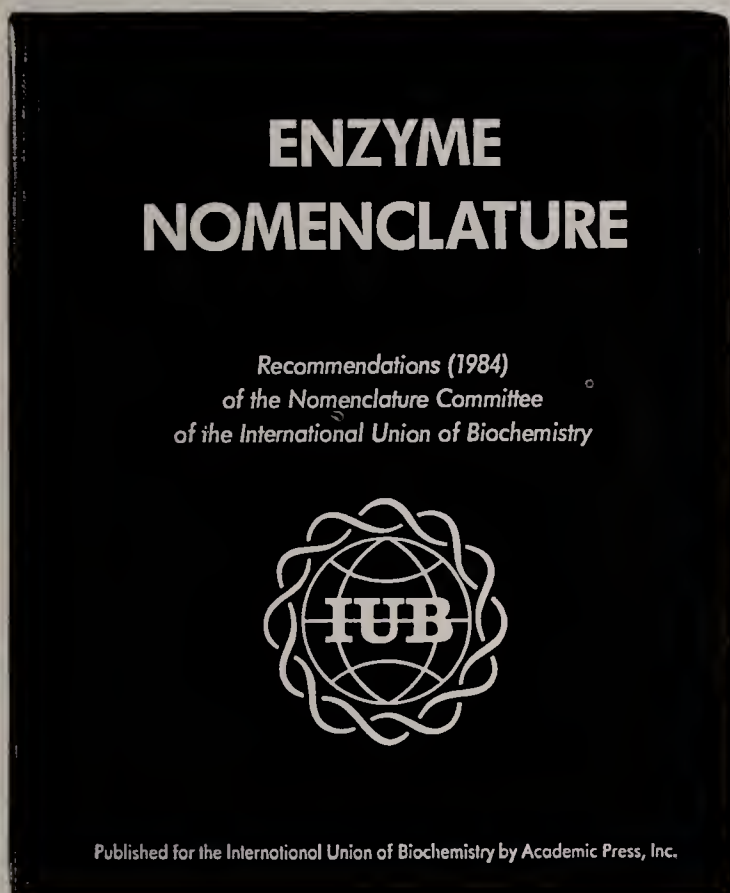
Sir,

Recently I was privileged to attend your General Assembly in Lyon, France. During my time at the Assembly I met chemists from many different countries. Our conversations at meetings, coffee breaks and social occasions naturally turned to IUPAC, its role and its programmes and also to your magazine, *Chemistry International (CI)*. I heard many forthright views not only on IUPAC but also on *CI*. Some of these were very complimentary but others less so. I suggested to

some of the chemists I met that they might consider sharing their views with a much wider audience — perhaps through the columns of *CI*. However, when I look back through recent issues of the magazine I find only one letter has been published — and that was from your predecessor! Can you not find a way of encouraging more letters to the IUPAC news magazine?

Michael Freemantle
Oxford, UK

Enzyme Nomenclature Recommendations (1984) of the Nomenclature Committee of the International Union of Biochemistry



These are the recommendations of the IUB Nomenclature Committee (NC-IUB) in consultation with four members of the IUB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN). This edition, which was jointly sponsored by IUPAC and IUB, is a revision of the NC-IUB Recommendations (1978).

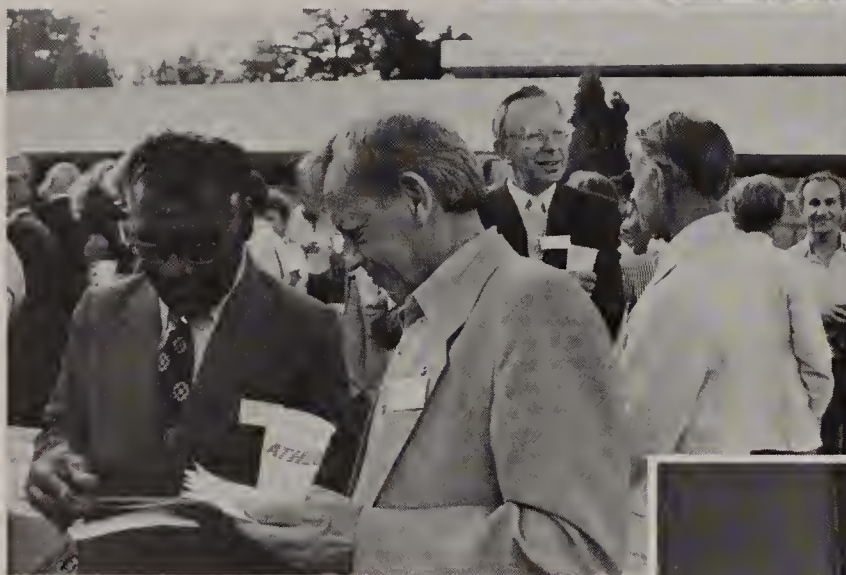
The book contains a historical introduction followed by a section on the classification and nomenclature of enzymes. Enzymes are listed under six main divisions (classes). These are: (1) Oxidoreductases, (2) Transferases, (3) Hydrolases, (4) Lyases, (5) Isomerases and (6) Ligases. The number of "live" entries in the list is 2477.

The book is published by Academic Press, Inc, Orlando, USA, 1984. ISBN 0 12 227162 9 or ISBN 0 12 227163 7 (pbk).

LYON

Rendez-vous with chemistry!

CTC Committee enjoy a joke. ►



◀ President Rao and Vice-President Koptug compare notes.

The Bureau meeting. ►



The 33rd IUPAC General Assembly

Approximately 800 chemists from 37 countries attended the General Assembly in Lyon this year. The first week of the Assembly was largely taken up with Committee and Commission meetings. After these meetings the Bureau met. The Assembly culminated in the 33rd Council meeting on the final two days. During the Council meeting Division Presidents and Chairmen of Standing Committees presented their reports. Elections of a new Vice-President and new Bureau Members also took place at the Council meeting.

Prof. Rao takes over as President

Prof. Rao (India), who became Vice-President of IUPAC in 1983 took over as President at the end of the Council meeting. One of his first tasks as President was to chair a meeting of the Bureau which took place on the Saturday afternoon immediately following the Council. A pen-portrait of Prof. Rao was published in *CI*, No. 4, p. 19 (1985).

Election of Officers

IUPAC has four officers: President, Vice-President, Secretary-General and Treasurer. The terms of office of the Secretary-General, Prof. T. S. West (UK) and Treasurer, Prof. A. Björkman (Denmark) expire in 1987. Since the Vice-President automatically assumes office as President at the end

of the Council meeting at the General Assembly there remained one vacancy — for Vice-President. This year there was only one nomination for the office of Vice-President. The nominee was Academician V. A. Koptug (USSR). He was elected unanimously by the Council.



Council preparing to vote.

Academician V. A. Koptug



Academician V. A. Koptug.

Academician V. A. Koptug was born in 1931, in Yuchnov, Kaluga District, USSR. He graduated from the Mendeleev Institute of Chemical Technology, Moscow, in 1954 and was appointed Junior

Research Fellow in 1957. In 1959 he was appointed Senior Research Fellow at the Institute of Organic Chemistry, Novosibirsk, later becoming Head of Laboratory and Head of Department. He was awarded his Doctorate of Chemistry in 1963 and became Professor (of physical organic chemistry) in 1965.

He is Vice-President of the Academy of Sciences of USSR and President of the Siberian Branch of the Academy of Sciences of the USSR. He became an Academician in 1979. He was Rector of Novosibirsk State University from 1978 to 1980.

Prof. Koptug's research interests include mechanisms of organic reactions, carbonium ion chemistry, spectroscopy, and computer applications in chemistry and chemical education.

He is the author of some 300 articles, 30 patents and 3 monographs and is also a member of the editorial boards of 3 scientific journals.

He became a Titular Member of Commission I.5 in 1957, was elected to the Bureau in 1979 and was re-elected in 1983. Since 1984 he has been Chairman of the Advisory Committee on Chemical Data Bases.



The École Supérieure de Commerce, Lyon.

Elections to the IUPAC Bureau 1985

The Bureau consists of the four Officers of the Union, the immediate Past-President, the Presidents of Divisions and 11 members elected by Council. This year there were six vacancies for elected members on the Bureau. Of the nine nominations the following six were elected:

- Prof. A. D. Campbell (New Zealand)
- Prof. V. Gold (UK)
- Dr M. L. Good (USA)
- Prof. Wei-Yuan Huang (China)
- Prof. S. Itô (Japan)
- Prof. I. Wadsö (Sweden)

◀ Prof. S. Itô



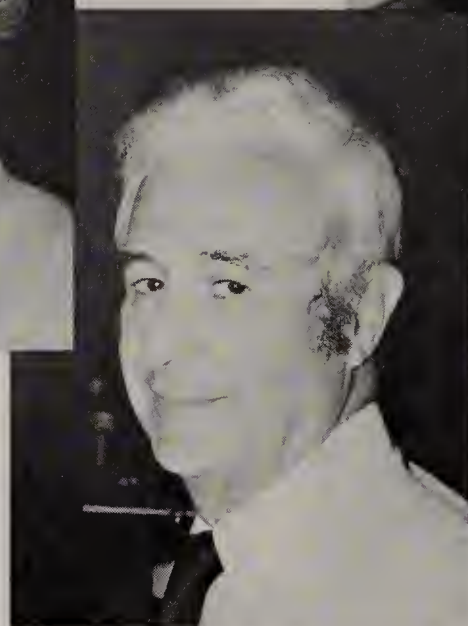
Prof. I. Wadsö



Prof. Wei-Yuan



▲ Dr M. Good



◀ Prof. V. Gold

◀ Prof. A. D. Campbell

Prof. A. D. Campbell (New Zealand)

Prof. A. D. Campbell is currently Mellor Professor of Chemistry and Chairman of Department at the University of Otago, Dunedin, New Zealand. He has been a National Representative on the Commission on Microchemical Techniques and Trace Analysis (V.2) since 1976, a member of the Bureau for the past 4 years and New Zealand Delegate to IUPAC Council Meetings at Davos, Leuven and Lyngby. He was symposium editor for the 10th IUPAC Symposium on the Chemistry of Natural Products.

A graduate of the University of Otago, Prof. Campbell studied with Prof. J. W. Cook at Glasgow University 1953–54 while holder of a Corday Morgan Commonwealth Research Fellowship and with Prof. R. Belcher at Birmingham University 1961 on a Nuffield Commonwealth Research Fellowship. Besides the usual University committees he is a former President of the New Zealand Institute of Chemistry and has been Chairman of the Chemical Testing Registration Advisory Committee of the Testing Laboratory Registration Council of New Zealand since its inception in 1973.

Prof. V. Gold (UK) (see p. 3)

Prof. V. Gold was born in 1922 and educated at King's College and University College, London. He obtained his PhD in 1945 and DSc in 1958. He became a Fellow of University College in 1973 and a Fellow of King's College in 1975. He is also a Fellow of the Royal Society of Chemistry and since 1972 has been a Fellow of the Royal Society. He was recipient of the Ingold Medal and Lectureship, Royal Society of Chemistry, 1984–85.

In 1964 he became Professor of Chemistry at King's College, University of London and since 1971 has been Head of Department of Chemistry there. He was also Dean of the Faculty of Natural Science, 1978–80.

His research interests and publications have ranged over the theory and practice of pH measurements, carbonium ions and proton-transfer reactions. Since 1983 he has been editor of *Advances in Physical Organic Chemistry*.

Prof. Gold was Chairman of the British National Committee for Chemistry from 1978 to 1984 and as

such has been leader of the British delegation to the IUPAC Council meetings held during this period. He was largely responsible for the suggestions which led to the present subscription structure within IUPAC. He has also been active within IUPAC as a Titular Member of the Organic Chemistry Division, Commission III.2 since 1973, and he has been Chairman of the Commission since 1983. He is Chairman of the Division's Working Party on Stereochemical Terminology, and since 1979 has represented the Division on the Interdivisional Committee of Nomenclature and Symbols (IDCNS). He is on the Executive Committee for the 1985 IUPAC Congress being held in Manchester.

Dr M. L. Good (USA)

Dr Mary Good was born in Grapevine, Texas, USA in 1931 and studied at the University of Central Arkansas, obtaining her BS in Chemistry in 1950. She was awarded her MS (1952) and PhD (1955) degrees by the University of Arkansas, Fayetteville, for research in inorganic and radiochemistry. She started to teach chemistry at Louisiana State University (LSU), Baton Rouge, in 1954, became an assistant professor, in 1958. In 1961 she became professor of chemistry in New Orleans and, in 1974, Boyd Professor — a distinguished professorship. She moved back to Baton Rouge in 1979 as Boyd Professor of Materials Science, in the College of Engineering. In 1981 Dr Good left the academic world for the industrial, joining UOP Inc in Des Plaines, Illinois, where she is now Vice-President and Director of Research.

Dr Good's scientific research activities have been very largely concerned with the solution of chemical or structural problems by various spectroscopic techniques — the characterization of species in solution or in solid materials.

Dr Good is a member of the National Science Board (a US Presidential appointment), which develops policy for the US National Science Foundation and the executive branch of government, and also of the Board of Directors of the Industrial Research Institute, an organization which consists of the Vice-Presidents or Directors of Research of most of the major technology companies in USA. She was elected directly as Vice-President of the IUPAC Inorganic Chemistry Division in 1979, succeeding to the Presidency in 1981 for a 4-year term.

Prof. W. Y. Huang (China)

Prof. Huang was born in 1921. He obtained a BS from Fukian Christian University in 1943, MS from Lingnan University, Canton in 1949 and his PhD from Harvard University in 1952. In 1982 he received the National Prize for Natural Sciences and was twice awarded the National Prize for Scientific Invention — in 1965 and 1981 respectively. He was also twice awarded the National Prize of Military Sciences and Technology in 1979.

His major research interests and publications cover organofluorine chemistry, chemistry of natural products and organoboron chemistry. He is Vice

Editor-in-Chief of *Acta Chimica Sinica* and a Member of the International Advisory Board of *Heilbron Dictionary of Organic Chemistry*.

Prof. Huang is a Member of Academia Sinica, Vice-President of Shanghai Branch Academia Sinica and Director of the Shanghai Institute of Organic Chemistry. He has been active in IUPAC as National Representative and coopted member of the Organic Chemistry Division.

Prof. S. Itô (Japan)

Prof. S. Itô was born in 1924. He graduated with a BPharm in 1944 and a BSc from Tohoku University in 1950. He obtained his DSc in Chemistry in 1957. Since 1965 he has been Professor at Tohoku University. He was Dean of the Faculty of Science of the University, 1979–82. From 1977–79 he was a Member of the Board of Directors, Chemical Society of Japan, and since 1981 has been a Member of the Science Council of Japan.

His major research interests and publications cover natural product chemistry including the structure elucidation and synthesis of terpenoids and alkaloids and also novel aromatic chemistry including synthesis, physical properties and reactions of troponoids, azulenoids, annulenes and phanes. He is the author of over 180 publications and some 300 books and reviews. He has been the member of various Editorial Boards and is currently on the Editorial Board of *Topics in Current Chemistry* (Springer-Verlag).

His experience with IUPAC dates back to 1971 when he became a Member of the Organic Chemistry Division. He subsequently became Secretary (1975–77), Vice-President (1977–79), President (1979–81) and Past-President (1981–83) of the Division.

Prof. B. I. Wadsö (Sweden)

Prof. B. I. Wadsö was born in 1930. He obtained a BA from the University of Lund in 1950 and a PhD in Chemistry in 1962. In 1970 he received the Arrhenius plaque from the Swedish Chemical Society and in 1979 the Huffman Memorial Award at the US Calorimetry Conference. In 1984 he received the award for "Applied Chemical Thermodynamics" from the Swiss Society for Thermal Analysis and Calorimetry.

From 1974 to 1981 he was Research Professor of the Swedish Natural Science Research Council, University of Lund and since 1981 has been Professor of Thermochemistry at the same university.

His research has been primarily concerned with instrument and method development in thermochemistry, particularly microcalorimetry, and also the thermodynamics of aqueous solutions and biochemical and biological systems.

Prof. Wadsö became involved in the work of IUPAC in 1967 when he joined the Commission on Thermodynamics (I.2). He was a Titular Member from 1973–81. At present he is a coopted member of the Physical Chemistry Division Committee. From 1975–80 he was Chairman of the Interunion Commission on Biothermodynamics (IUPAC, IUB, IUPAB) and became Chairman again in 1983.

Meeting with representatives of Associated Organizations

Representatives from several Associated Organizations attended a luncheon meeting with IUPAC Division Presidents. The representatives included Dr A. S. Al-Tai (Union of Arab Chemists); Prof. D. Behrens (European Federation of Biotechnology, European Federation of Corrosion); M. Devaux (Groupement pour l'Avancement des Methodes Spectroscopiques et Physico-Chimiques d'Analyse, GAMS); Prof. R. Parsons (International Society for Electrochemistry); Prof. H. Pietsch (International Committee for Science of Photography); and Prof. H. J. Seifert (International Confederation for Thermal Analysis).

The luncheon took place immediately after the end of the Council meeting on Saturday 7 September 1985. The Chairman of the meeting which followed the luncheon was the new President, Prof. C. N. R. Rao. He invited each representative in turn to talk about their organization and its links with IUPAC. The President said that IUPAC looked forward to growing and fruitful cooperation with the Associated Organizations. Following the address by Dr Al-Tai, Prof. Rao said that he hoped that more Arab countries would now become involved with the Union.



Dr A. S. Al-Tai, Union of Arab Chemists, speaking at the luncheon meeting.

The Lyon Council Reports

CHEMRAWN

The following is the text of the report of the CHEMRAWN Committee presented by its Chairman, Dr Bryant Rossiter, to Council in Lyon. Further details of CHEMRAWN's activities — past, present and future — were published in *CI*, No. 4, pp. 20–27, 1985.

Since my report to Council two years ago, CHEMRAWN activities have fallen into three principal categories: completion of CHEMRAWN III, follow-up to CHEMRAWN II, and preparation for three additional conferences.

CHEMRAWN III, 'World Conference on Resource Material Conversion: Chemical (Bio) Process Bridges to Future Needs', was held in The Hague, Netherlands, 25–29 June, 1984. This conference was attended by 210 individuals from 27 countries. Because attendance was not as high as we had anticipated, a financial deficit was incurred. However, the technical content of the presentations and the level of competence of the speakers and participants were of the highest order, and from this point of view the conference must be considered an outstanding success. The *Perspectives and Recommendations* volume will be sent to all participants, and additional copies will be available through the IUPAC Secretariat in October 1985. This is essential reading for those seeking a global and timely view of future trends in chemical raw material supplies and their transformation into articles of commerce. The CHEMRAWN Committee expresses its sincere appreciation to Dr Wero Beek, the



Dr Bryant Rossiter (USA), Chairman of the CHEMRAWN Committee, puts the finishing touches to his report. Notice the tie.

Royal Netherlands Chemical Society, and members of the Organizing, Programme, and Future Actions Committees for their untiring efforts in bringing this conference to a successful conclusion.

CHEMRAWN IV, "The Global Ocean: Its Chemistry and Resources", scheduled for Woods Hole, Massachusetts, USA, has been postponed from September 1985 to 24–29 March 1986 to guarantee adequate funding, assure greater participation of developing country scientists, and accommodate the involvement of world leaders who are crucial to the success of the conference. CHEMRAWN IV will review from an international point of view those oceanic chemical processes, cycles, and resources important to all mankind. This will be done by focusing on the natural chemical processes of the oceans and then concentrating on the chemical resources of the seas and the seabeds, including food and biochemical resources and the technology and environmental effects involved in utilizing these resources. The programme is essentially complete and the organizers are fully confident the meeting will achieve all conference objectives. Dr C.G. Overberger is the CHEMRAWN Committee liaison to this conference, which is cosponsored by the American Chemical Society, the Scientific Committee on Oceanic Research, and the Year of the Ocean.

CHEMRAWN V, "Current and Future Contributions of Chemistry to Health: The New Frontiers", is scheduled for 22–26 September 1986, in Heidelberg, Federal Republic of Germany. CHEMRAWN V will identify and assess those contributions which significantly improve the diagnosis, prevention, understanding, and therapy of major disease classes and metabolic disorders. This conference is cosponsored by IUPAC and the Gesellschaft Deutscher Chemiker (GDCh). The CHEMRAWN V Committee is headed by Prof. Dr H. A. Staab, President of the GDCh and the Max-Planck Society, and it includes many world leaders from chemical and medical communities. Dr Wolfgang Fritsche, Secretary General of the GDCh, is Chairman of the Organizing Committee, and Dr Joachim Klein is the CHEMRAWN Committee liaison to the conference. Dr Fritsche reports that the programme is almost complete and that funding for the Conference is now assured.

CHEMRAWN VI, "World Conference on Advanced Materials for Innovations in Energy, Transportation, and Communications", is scheduled for 17–22 May 1987 in Tokyo, Japan. This conference will deal with those advanced materials required for major innovations in energy, transportation, and communications. The implications of these innovations and their potential progressing upon society will be discussed. Plans for CHEMRAWN VI are progressing rapidly under the direction of Dr Saburo Nagakura, Chairman of the Organizing Committee; Dr M. Uchida serves as the CHEMRAWN Committee liaison. CHEMRAWN VI is cosponsored by the Science Council of Japan and the Chemical Society of Japan.

The results of CHEMRAWN II continue to draw global attention. Shortly after the Conference in

December 1982, the United States Agency for International Development (USAID) informed the IUPAC CHEMRAWN Committee that as a direct result of CHEMRAWN II, chemistry in world food production had been designated one of five major areas for innovative research to be supported by USAID. In addition, the CHEMRAWN Committee Chairman was nominated by the Industrial Research Institute to serve as a member of the USAID Research Advisory Committee, and this position was accepted.

In January 1985, five members of the CHEMRAWN II Future Actions Committee met with the President and 30 cabinet- and ministerial-level officials of Sri Lanka to discuss ways of incorporating CHEMRAWN II recommendations into their national science and technology programme. A similar workshop is planned for Argentina in May 1986. CHEMRAWN II *Perspectives and Recommendations* played a major role in the First Pan American Chemical Congress scheduled for 14–18 October 1985, in Puerto Rico.

The CHEMRAWN Committee Chairman was invited to participate in the "South-South and South-North Cooperation in Chemical Sciences Conference", held in Trieste, Italy, 5–10 July 1985,

"CHEMRAWN is more than a series of conferences; it is a process for dealing with world problems systematically, where all the elements of the system are considered, not just the technical components."

and sponsored by the Third World Academy of Sciences. CHEMRAWN was a much-discussed subject and there is no question that IUPAC, through its CHEMRAWN programme, is considered by Third World leaders as the leader among the ICSU Unions in promoting the scientific and technological development of their countries.

Finally, I wish to comment on current overall progress. CHEMRAWN conferences have been unique in their outlook, objectives, purposes, and approaches. CHEMRAWN is more than a series of conferences; it is a process for dealing with world problems systematically, where all of the elements of the system are considered, not just the technical components. CHEMRAWN is a new IUPAC venture. Like all new ventures, CHEMRAWN has been a learning experience with attendant risks, losses, successes, and rewards. As an innovation, CHEMRAWN is attempting to cross many barriers, sometimes several at a time. For example, CHEMRAWN was the first IUPAC body to:

1. bring together diverse elements from many disciplines to address major world problems within the context of the entire system;
2. involve high-level decision makers from industry, government, academia, and world financial institutions in expressly identifying new research initiatives and priorities;
3. develop specific, creditable recommendations for future action and then raise funds to publish and distribute the recommendations to world-wide decision makers;

4. hold a major meeting in a developing country;
5. involve the Third World leaders in the planning, execution, and follow-up of conferences relating to their interests in a major way.

In addition, CHEMRAWN activities have raised over one million US-dollars, paid all expenses of the Committee, met the deficit for CHEMRAWN III

“CHEMRAWN should continue to progress rapidly and successfully. It is adding an important new dimension to the IUPAC mission and there is evidence that CHEMRAWN is increasingly cited as a reason for supporting the broader IUPAC programme.”

without drawing upon IUPAC General Funds and the CHEMRAWN account has a strong, positive balance.

Overall, CHEMRAWN should continue to progress rapidly and successfully. It is adding an important dimension to the IUPAC mission and there is evidence that CHEMRAWN is increasingly cited as a reason for supporting the broader IUPAC programme. At the same time, CHEMRAWN must continue to be nurtured as it moves beyond the experimental stage. It must be aggressive in addressing the opportunities, indeed responsibilities, before it and yet restrict its activities to high-impact areas; it must be cautious in its financial

exposure and not undertake more than it is capable of handling effectively. CHEMRAWN is following a proper course in this regard, and its success is largely the result of the hard work of CHEMRAWN Committee members and the strong support it has received from IUPAC Executive Committee, Bureau, and other parts of the IUPAC structure, including the Committee on Chemical Industry.

I wish to acknowledge gratefully the devoted and effective service of Dr Guenor Zaikov, who will leave the Committee upon the expiration of his term at the end of the year.

We welcome as a new Committee Member Dr Wero Beek, Director of Research and Development, Unilever, Netherlands; Dr Alan Hayes, Chairman, Plant Protection Division, ICI, England; and Dr Joachim Klein, Wissenschaftlicher Direktor, Gesellschaft für Biotechnologische Forschung GmbH, Federal Republic of Germany. We also welcome as Associate Members Dr Edward Grzywa, Minister of Chemical and Light Industries in Poland, Dr William G. Schneider, Immediate-Past President IUPAC, and Dr S. Varadarajan, Secretary to the Government of India and Director General of the Council of Scientific and Industrial Research. Dr Charles G. Overberger will continue as an Associate Member to the end of 1986. We gratefully acknowledge the contributions of Dr G. S. Sidhu who announced his retirement from both the Committee and his position as Director General, Council of Scientific and Industrial Research, India.

Safety in production and application of chemistry

At Lyon the CHEMRAWN Committee and Committee on Chemistry and Industry (COCI) proposed to Council that IUPAC address matters of chemical safety and further that a study team should be set up to identify goals, objectives and initial activities for this new IUPAC initiative. The proposal, the text of which is reproduced below, was presented to Council by Dr Bryant Rossiter. Council approved the proposal.

The extraordinary advances that have taken place during the last 35 years in the basic understanding of chemical reactions, structure of complex molecules, including polymers of all sizes, and a variety of techniques for separation of molecular species and their identification through chemical analysis and different forms of spectroscopy, have resulted in a very rapid growth in the application of these chemicals for the benefit of mankind. The discovery of sizeable deposits of petroleum hydrocarbons during the same period has provided raw materials and energy requirements for the very large scale production of these chemical entities. The major visible improvements in a variety of areas such as productivity in agriculture preservation, packaging, storage and distribution of food, improvements in expectation of life and health, and provision of textiles, housing, communications and transport, have been possible only through these developments in scientific research, development and industrial production.

The ever-growing needs for food, better health and improvements in the quality of life of all

mankind cannot be realized without a further large increase and spread in the manufacture of chemical products such as fertilisers, pesticides, agrochemicals, polymers, fibres, synthetic drugs, antibiotics, surface active agents, dyes, pigments and a host of chemical products essential for agriculture, food, nutrition, health, housing, communications, transport, energy, clothing, structures and environment. It is not surprising therefore that rapid growth is taking place in the chemical industry and the manufacture, transportation and use of these essential materials is spreading to many countries including developing countries.

As the knowledge of synthesis and properties of chemicals and of the engineering for large-scale manufacture grows, there is constant endeavour to lower costs through large economies of scale in production. Compared to those 40 years ago, present plants are huge, and single stream plants are now often 100 times the size of plants of earlier times. Simultaneously, a large amount of special instrumentation controls including microprocessors and computers have come to play a major role.

Many of the important chemicals and intermediates are highly inflammable, and can undergo reactions which can be violently self-sustaining. Other intermediates and products, when used improperly are toxic to Man and life systems; others can be explosive. Production, storage, transport and use all require substantial training, full knowledge of consequences of deviation from norms or unanticipated events.

Many of the new chemical products and intermediates are designed to act preferentially to contain pests, parasites or microorganisms which are inimical to Man's well being and prosperity. Yet these depend on their application on the principle of selective toxicity, whether they be drugs, insecticides or bacteriocides. Therefore, exposure to these under non-controlled conditions may produce immediate or delayed or even long-term deleterious effects. There are dangers not only to workers in factories or to users in the field but in certain circumstances, the public at large can also be exposed to risk.

The healthy growth of a chemical industry and use of chemical products for the benefit of mankind depends on the evolution of systems of appropriate safeguards, training of personnel in production and use, and of disclosure of information to the public on the benefits and risks involved. While the vast majority of operations secure a high degree of safety, small unintended errors lead to damage and produce in turn a disproportionate distrust in the practitioners of chemical sciences. Recent events of explosions, release of toxic materials and fatalities amongst the public have heightened public and government consciousness of the needs for absolute safety in all sectors involving chemicals.

IUPAC, with its stature of internationalism, independence and access to expert knowledge, clearly has an obligation to make a study of the implications in safety through the growing application of chemistry for the benefit of mankind. Education, training, information dissemination,

open debate, standards, analytical procedures, properties of materials both physical and biological, disposal of materials, environment are all subjects of vital interest to the Union. It is therefore appropriate that IUPAC take an initiative in organising an objective and independent examination of all aspects of production, transfer of technology and application involved in chemicals. The life and health of every living human being are precious and all steps should be taken and all knowledge brought to bear collectively to foresee problems and find solutions.

Accordingly the CHEMRAWN Committee and Committee on Chemistry and Industry recommends that IUPAC assumes under its charter the responsibility to address matters of chemical safety in their broadest aspects and in a continuing way.

International bodies such as the International Labour Organization (ILO), the World Health Organization (WHO), the United Nations Industrial Development Organization (UNIDO), the UN Conference on Trade and Development (UNCTAD) and the UN Food and Agricultural Organization (FAO) are all concerned with these questions in part. IUPAC can however call upon a world-wide bank of non-political expertise. In addition experts from other International Council of Scientific Unions (ICSU) bodies or representatives of organizations of manufacturers or of professional bodies concerned with toxicity and safety could profitably contribute to such studies.

Further, and in view of the importance of safety and its practice and perceptions in both the developing and developed world, the CHEMRAWN Committee and Committee on Chemistry and Industry recommend that Dr William G. Schneider, Immediate Past President of IUPAC, be appointed to head the study team to identify goals, objectives and proposed initial activities for this new IUPAC initiative.

Biennial Reports of the Division Presidents (1983/85)

I. Physical Chemistry Division

General Division Activities

The Division has pursued its work with renewed vigour during the past two years. Three of the Commissions elected new Chairmen in 1983, and many new members were added. In addition, significant structural changes in the Division, which were decided in Lyngby, have been implemented. The new Commission on Chemical Kinetics (I.4) has been set up and members appointed. A Division Subcommittee on Physicochemical Measurements and Standards has been established to complete the work of the previous Commission of the same name.

Much attention has been given to the promulgation of IUPAC recommendations to the chemical community, which continues to be a problem. As one example, letters were written to a number of



Dr D. Lide.

journal editors and textbook authors explaining the recent IUPAC recommendation for a change in standard state pressure. Authors were encouraged to convert to the new standard and to state clearly their convention. Comments from editors and authors were also solicited; several responses have already been received.

We were saddened by two deaths during the past year. Prof. Ervin Wolfram, Secretary of the Commission on Colloid and Surface Chemistry, died in April. Prof. Wolfram had been a member of the Commission since 1975 and was also serving as a member of the Division Nominating Committee. Prof. Klaus Schaefer of the University of Heidelberg died in July. He made many contributions to the Commission on Thermodynamics in the 1955–65 period, including a term of service as its Chairman.

This report will summarize the activities of the Commissions and Division Subcommittees. A list of publications appears at the end.

Commission I.1. Physicochemical Symbols, Terminology, and Units

Since Lyngby, many manuscripts with recommendations prepared by other Commissions of Division I and other IUPAC bodies have been reviewed by I.1, and remarks or suggestions in regard to the consistent use of symbols, terminology and units have been sent to the authors. Three important problems listed below have been given much attention and consideration:

1. The standard state pressure and related problems (I.2 and II.3).
2. Physicochemical quantities and units in clinical chemistry (I.2 and VII.2).
3. Reorganization of the present contents of the Manual and its Appendices, particularly the present Appendix I (I.2, I.3 and I.6).

In addition, the Commission has had much formal and informal contact with several organizations and groups in IUPAC and outside, particularly with several NAOs on the matter of republication and translation of the Manual of Symbols and Terminology. Information on the current activities of the Commission has been circulated via *Chemistry International*.

The task group which is working on a new edition of the Manual of Symbols and Terminology met in Zagreb (September 10–13, 1984) and in Reading (March 4–7, 1985) has made considerable progress. A complete manuscript, which contains many new features but retains the main objectives and basic structure of the present Manual, will be brought to the Lyon meeting.

Finally, a draft manuscript of the proposed Abbreviated List of Symbols, Terminology, and Units was prepared and reviewed within the Division. Comments were also obtained from the Committee on Teaching of Chemistry. This document will be finalized at Lyon.

Commission I.2. Thermodynamics

The Commission met on the occasion of the IUPAC International Conference on Thermodynamics in Hamilton, Canada, in August 1984 to discuss progress on the Commission's projects. Much effort has gone into the revision of the parts of the Manual of Symbols and Terminology which involve thermodynamics. The issue of standard state pressure has been addressed in an article by Dr S. Angus, Secretary of I.2, in *Chemistry International (CI)* and a meeting on the subject is planned at Lyon. A document on Classification of Calorimetric Instruments has been drafted and will be discussed further at Lyon. Another project, Standard States of Mixtures, has encountered problems because of the differences of opinion among experts on this rather complex subject. Final decisions may have to be deferred until the 1987 General Assembly.

The Subcommittee on Thermodynamic Tables has continued to oversee several data compilation efforts. A very comprehensive book on Enthalpies of Vaporization of Organic Compounds has been approved for publication. The Subcommittee has also taken the lead in organizing the International Meetings on Phase Equilibrium Data which will take place in Paris September 5–13, 1985, immediately following the Lyon General Assembly. The registration for these meetings, which will emphasize fluid properties and thermochemical data required by the chemical industry, has exceeded expectations.

A successful meeting of the Subcommittee on Transport Properties was held in London in March 1984. The first data compilations resulting from this project has been completed, and several others are in an advanced state.

Commission I.3. Electrochemistry

Several documents have progressed. "Recommendations on Reporting Electrode Potentials in Non-Aqueous Solvents" was published in final form in *PAC* in April 1984. This will be reprinted in *Electrochimica Acta* to obtain wider distribution among electrochemists. A document "Interphases in Systems of Conducting Phases" has been revised in the light of comments received on the provisional publication and has received final Division approval. Another document "The Absolute Electrode Potential. An Explanatory Note" has been approved and its synopsis published in *CI*. A major data compilation edited by A. J. Bard, J. Jordan and R. Parsons, "Oxidation–Reduction Potentials in Aqueous Solutions", has received the final approvals and is being published.

The document "Electrochemical Corrosion Nomenclature" by K. E. Heusler *et al.* was extensively discussed at a task group meeting in Lausanne in November 1984. The revised draft was sent to reviewers for comments and a final version has been submitted to Commission I.1. The document "Fundamentals of Energy Conversion. I. Interfacial Ion Transfer" by K. E. Heusler was revised along the lines suggested by the Commission in Lyngby and sent to reviewers. A new version has been prepared

which is now being examined by the Commission Chairman.

A Meeting is scheduled in May 1985 in Austin, Texas, to revise the document "Fundamentals of Energy Conversion. II. Semiconductor Electrochemistry".

Commission I.4. Chemical Kinetics

The appointment of members of this new Commission, which will contain representatives from many parts of IUPAC, has been completed. The first organizational meeting will be held at Lyon.

Commission I.5. Molecular Structure and Spectroscopy

The document "Names, Symbols, Definitions, and Units of Quantities in Optical Spectroscopy," which represents a long-standing joint effort of I.5 and VII.2, has been completed and published, as has the document "Text Data for Normal Coordinate Calculations". Two other documents, "A Descriptive Classification of Electron Spectroscopies" and "Specifications for Infrared Reference Spectra of Molecules in the Vapor Phase" have received final Division approval. The document "Chiroptical Techniques: Nomenclature, Symbols, and Units" has been approved and is now being prepared for publication.

The first two chapters of an extensive document on "Notations and Conventions in Molecular Spectroscopy" has been circulated in draft form to a list of experts in this field.

Commission I.6 Colloid and Surface Chemistry Including Catalysis

The subcommittee on Reporting Experimental Data for Gas/Solid Adsorption completed its work at Lyngby and the chairman was left to prepare the final version of the recommendations on "Reporting Physisorption Data for Gas/Solid Systems with Special Reference to the Determination of Surface Area and Porosity". This document received the President's approval in 1984 and was published in April 1985.

Another project which was completed in 1984 was that on "Reporting Experimental Pressure-Area Data with Film Balances". The final report was prepared for publication by Dr L. Ter-Minassian-Saraga and appeared in print in April, 1985.

The recommendations on "Reporting Data on Adsorption from Solution at the Solid/Liquid Interface", prepared by Prof. D. H. Everett, have been issued in provisional form and comments invited for consideration by the Commission at the Lyon meeting.

The subcommittee on Catalyst Characterization and Standardization has held two meetings (Berlin in July 1984 and London in March 1985). The chairman, Prof. J. Haber, has undertaken to prepare the first complete draft of a manual on catalyst

characterization for consideration by the Commission in Lyon. It is hoped that this will be ready for distribution in provisional form by the end of the year.

The preparation of the "Lexicon of Experimental Techniques in Surface Chemical Physics" is taking much longer than was envisaged in 1983, and it is doubtful whether the provisional recommendations can be distributed before the Commission meets in Lyon. The future of this project will require careful assessment.

Subcommittee on Physicochemical Measurements and Standards

The task of this Subcommittee is to complete the work of the former Commission of the same name. The major project, preparation of a book "Recommended Reference Materials and Methods for the Realization of Physicochemical properties" is almost completed. Drafts of most of the chapters are being edited and will be put in final form in Lyon.

Subcommittee on Plasma Chemistry

The Subcommittee has organized the 7th International Symposium on Plasma Chemistry, Eindhoven, Holland, July 1-5, 1985. In addition, a Short Course on Plasma Chemistry has been developed and will be given for the first time during the week preceding the Eindhoven Symposium. A document on "Solid Particle Measurements in Thermal Plasmas" has been completed. The "Bibliography on Plasma Chemistry," which has been produced by the Subcommittee for several years, will be terminated because the capability for on-line computer searches of the literature has reduced the need for a printed bibliography.

Publications

(a) Reports/Articles

Recommendations on Reporting Electrode Potentials in Nonaqueous Solvents (Recommendations 1983). *PAC*, 1985, **56**, 461-66.

Names, Symbols, Definitions, and Units of Quantities in Optical Spectroscopy (Recommendations 1984). *PAC*, 1985, **57**, 105-20.

Test Data for Normal Coordinate Calculations. *PAC*, 1985, **57**, 121-48.

Reporting Physisorption Data for Gas/Solid Systems with Special Reference to the Determination of Surface Area and Porosity (Recommendations 1984). *PAC*, 1985, **57**, 603-19.

Reporting Experimental pressure-Area Data with Film Balances (Recommendations 1984). *PAC*, 1985, **57**, 621-32.

Definition of pH Scales, Standard Reference Values, Measurement of pH, and Related Terminology (Recommendations 1984). *PAC*, 1985, **57**, 531-42.

The Thermal Conductivity of Fluid Air. K. Stephan, & A. Laesecke, *J. Phys. Chem. Ref. Data*, 1985, **14**, 227-34.

The Viscosity of Nitrogen, Oxygen, and Their Binary Mixtures in the Limit of Zero Density. Wendy A. Cole, & William A. Wakeham, *J. Phys. Chem. Ref. Data*, 1985, **14**, 209–26.

The Standard State Pressure in Chemical Thermodynamics. S. Angus, *CI*, 1985, No. 1, 17–18.

Provisional recommendation announced in *Chemistry International: The Absolute Electrode Potential*. An Explanatory Note, *CI*, 1984, No. 6, 38.

(b) *Books*

International Thermodynamic Tables of the Fluid State. Vol. 8 – Chlorine. S. Angus, B. Armstrong & K. M. de Reuck, Pergamon Press, 1985.

Standard Potentials in Aqueous Solution. A. J. Bard, J. Jordan & R. Parsons, Marcel Dekker, Inc, 1985.

Enthalpies of Vaporization of Organic Compounds. V. Majer & V. Svoboda, Blackwell Scientific Publications, 1985.

D. R. Lide, Jr
President

II. Inorganic Chemistry Division

The Inorganic Division has been very active during this biennium. All Commissions have been very busy, particularly Commissions II.2 and II.3. Commission II.2 has been working toward having all chapters in the new Red Book completed by the end of 1985. Commission II.3 has been very active with one major project, the IUPAC Thermochemical Data Bank, having been completed. The Division Executive Committee met twice, once at the International Coordination Conference in Boulder, Colorado, in the summer of 1984 and again in April 1985, in Des Plaines, Illinois. The agendas included a review of all Divisional programmes and the completion of required Divisional business, including the selection of nominees for Divisional offices. Particular attention was given to the completion dates of on-going programmes and the possible establishment of new activities. The budget situation for the Division was tolerable because of significant travel expense pick-up by the employers of Division and Commission members and by the budget supplement provided to Commission II.2 in late 1984. The Executive Committee strongly recommended the establishment of a new budget line for new project starts and the return to ten members of the Division Committee. The Executive Committee also strongly recommended that the exception to Commission II.2 to have eight titular members be made permanent and that Commission II.3 be restored to eight titular members. It was felt that Commission II.1 could continue with six titular members for the time being.

The President of the Division has reviewed the request for IUPAC sponsorship for a number of international conferences and thirteen have been approved for this biennium. Several manuscripts have been reviewed for publication and/or submission to IDCNS. A summary of Commission activity follows.

Commission II.1. Atomic Weights and Isotopic Abundances

This Commission has four on-going projects with the "Review and Evaluation of Operational Procedures for Assigning Uncertainties to Atomic Weight Values" expected to be completed in 1985. Two reports on "Atomic Weights and Isotopic Abundances" and one comprehensive "Element-by-Element Review of Atomic Weights" were published in *PAC*. A two-day meeting of the working party on operations procedures was held at the National Bureau of Standards in Washington, DC. Their report will be presented to the full Commission for approval in Lyon.

Commission II.2. Nomenclature of Inorganic Chemistry

This Commission has been very busy trying to complete all chapters of the revised Red Book by the end of this biennium. Part I includes eleven chapters in all. Five chapters (Aims, Functions, and Methods; Grammar; Elements, Atoms and Groups of Atoms; Formulae; and Ions, Radicals, and Salts) have been approved by the Commission and the Division President and are moving through IDCNS toward publication. Chapters 5, 6, 7, 8, 9, and 10 have all been reviewed by the Commission and a final draft for presentation to the Division President and IDCNS is expected to be completed for Lyon. Chapter 11, "Boron Compounds", is less well advanced because of the difficulty in finding a



Dr Mary Good passes on some information to Prof. E. Fluck, Secretary of the Inorganic Chemistry Division Committee.

volunteer to write the material. Part II of the Red Book is concerned with more specialized topics and will be addressed in detail as soon as Part I is finished. Some chapters have been completed in draft and others are in progress.

The work load of this Commission is very heavy and the return to eight permanent titular members is very desirable.

Commission II.3. High Temperature and Solid State Chemistry

The Commission is one of the most active science oriented Commissions in IUPAC. They have several ambitious programmes underway in bibliographic collections on topical issues; detailed, evaluated data banks in several chemical systems; and experimentally evaluated standards for various areas in high temperature and solid state chemistry. They have completed several studies during the biennium and published several papers in *PAC*. The most recent one, entitled "An Assessment of the Melting, Boiling, and Critical Point Data of the Alkali Metals", is an extensive review of the physical data for the alkali metals with verified data developed through "round-robins" in several laboratories.

This Commission addresses an area of data development where international cooperative efforts are necessary and where good, verified data is needed for the progression of the science. It is an outstanding example of the unique contributions which can come from IUPAC efforts.

Mary. L. Good
President

III. Organic Chemistry Division

General Activities

The Division Committee has played its usual role in the two areas of major interest: the supervision of Commission activities and the organization of Symposia, some of which are directly promoted by the Division.

Commission Activities

The Commissions operating under the supervision of the Division are: Nomenclature of Organic Chemistry (III.1), Physical Organic Chemistry (III.2) and Photochemistry (III.3). The fourth Commission on Medicinal Chemistry has been suspended for reorganization of this sector of chemistry within IUPAC and an "ad hoc" Working Group has been appointed to study the matter and to make proposals.

The Commissions have carried on the various projects as approved at the Lyngby Assembly (1983) obtaining significant results in their specific area of interest as detailed below.



Prof. G. Modena presents his report to Council.

Commission III.1 on the Nomenclature of Organic Chemistry

The Commission had a very fruitful meeting at Montreal, Canada, in July 1984. The usual work was carried out by correspondence.

Several projects have made significant progress and it is expected that some of them will be ready for approval at the Lyon meeting. Indeed, the final documents related to projects 14 and 20 have been approved and the "Treatment of variable valence in organic nomenclature (Lambda convention)" has been published under the supervision of W. H. Powell (*PAC*, **56**, 769-78, 1984).

Progress has been made on project 6. This will lead to two separate publications (Part I and Part II). Progress has also been made on the revision of project 4 and the preparation of the glossary of stereochemical terms (project 8, joint project with Commission III.2).

Commission III.2 on Physical Organic Chemistry

The Commission convened at Burlington, Vermont, in August 1984 and had a series of productive meetings. A consolidated final report of the several parallel projects on the naming of chemical transformations is now in preparation. Final reports on the two projects on the symbolization of reaction mechanisms have been distributed to a number of physical organic experts outside the Commission as the first stage of the approval procedure leading to adoption and publication by IUPAC. Similarly, the

final report on the naming of hydrogen (protium, deuterium, etc.) species has been sent out to experts. Work is progressing in the joint working party on stereochemical terminology and on the revision of the glossary of terms used in physical organic chemistry. At Lyon, the Commission will be evaluating the merits of several proposals for inclusion in the Commission's future programme of work.

Commission III.3 on Photochemistry

The Commission met at the IUPAC Photochemistry meeting in Interlaken (July 1984) and discussed the responses received on the glossary. The report was sent to IUPAC in September 1984. On the basis of these discussions, Prof. Braslavsky has updated the glossary. After a meeting of the Chairman and Prof. Braslavsky and further changes, the new edition was sent to the Commission members for comments. These have been received and incorporated. A final version is ready for approval by the Commission in Lyon.

The paper on fluorescence standards, first discussed at Lyngby, was modified and sent to a number of experts. It was briefly discussed at Interlaken, and recently, after comments were received by experts and members of the Commission, reworded. It is ready for circulation in the appropriate specialist Newsletter to obtain further comments before application for approval.

Concerning the education project, an example of how to formulate this idea has been sent to Prof. Tokumaru who will prepare a preliminary paper to be discussed at Lyon.

Working Group on Medicinal Chemistry

The Working Group under the chairmanship of Prof. C. Wermuth has made significant progress on reaching a solution to the problem of collocating Medicinal Chemistry within IUPAC structures. A preliminary report has been discussed at the Bureau meeting at Oxford in September 1984 and new directions given to the Working Group. Prof. Wermuth has also discussed the matter with representatives of ICMC. The whole problem will be revised during the Lyon Assembly.

Symposia and Conferences

The Division has further expanded its activity in promoting scientific conferences in emerging fields and countries. In fact, during the biennium, two new series of conferences have been initiated; one, the International Symposium on Bioorganic Chemistry, organized by Prof. R. Breslow, has already been held in New York, USA (6–8 May 1985), and a second, the International Symposium on Organic Chemistry in Technological Perspective, will be held on June 1–6 1986 in Jerusalem, Israel. This is being organized by Prof. D. Vofsi. Furthermore, the International Symposium on Organic Chemistry of Medicinal Natural Products will be held in Shanghai, China, 10–13 November 1985. This will be the

first IUPAC scientific event ever organized in China.

The organization of the Organic Chemistry Division's Symposia series has progressed at the usual pace by scheduling well in advance the events in different geographical areas. The Division has also followed with interest the organization by different groups of scientists at meetings in several areas of organic chemistry and recommended the IUPAC sponsorship when appropriate. The list of meetings held from 1984 onwards and of those already scheduled is reported below.

12th International Carbohydrate Symposium. Utrecht, Netherlands, 1–7 July 1984

14th International Symposium on Chemistry of Natural Products. Poznan, Poland, 9–14 July 1984

10th International Symposium on Photochemistry. Interlaken, Switzerland, 22–27 July 1984

7th IUPAC Conference on Physical Organic Chemistry. Auckland, New Zealand, 20–24 August 1984

5th International Conference on Organic Synthesis. Freiburg, Germany, 27–30 August 1984

VIII International Symposium on Medicinal Chemistry. Uppsala, Sweden, 27–31 August 1984

International Symposium on Carotenoid Chemistry. Munich, Germany, 27–31 August 1984

7th International Symposium on Organo Silicon Chemistry. Kyoto, Japan, 9–14 September 1984

International Symposium on Bioorganic Chemistry. New York, USA, 6–8 May 1985

5th International Symposium on Novel Aromatic Compounds. St Andrews, UK, 15–19 July 1985

4th Congress on Organometallic Chemistry Directed toward Organic Synthesis. Kyoto, Japan, 12–15 July 1985

10th International Congress on Heterocyclic Chemistry. Waterloo, Canada, 11–16 August 1985

Application of Mathematics to Chemistry. Dubrovnik, Yugoslavia, 2–5 September 1985

V Symposium on Marine Natural Products. Paris, France, 2–6 September 1985

3rd Noordwijkerhout Symposium on Innovative Approaches in Drug Research. Noordwijkerhout, Netherlands, 3–6 September 1985

International Congress on Organic Chemistry of Medicinal Natural Products. Shanghai, China, 10–13 November 1985

International Symposium on Organic Chemistry in Technological Perspectives. Jerusalem, Israel, 1–6 June 1986

15th International Symposium on Chemistry of Natural Products. The Hague, Netherlands, 17–23 August 1986

6th International Conference on Organic Synthesis. Moscow, USSR, 10–15 August 1986

8th IUPAC Conference on Physical Organic Chemistry. Tokyo, Japan, 24–29 August 1986

G. Modena
President

IUPAC creatures



The creatures shown above were observed in a recent IUPAC publication. This follows reports (see *CI*, No. 5, p. 4 and p. 34, 1985) of other strange creatures appearing in IUPAC publications. The Commission on Pesticide Chemistry (VI.5) has now been called in to investigate (see p. 35).

COMMISSION NEWS

The following are reports of some of the Commission meetings in Lyon. They are based on Summary Minutes submitted by the Secretaries. Further news of the Lyon Commission meetings will appear in subsequent issues of *CI*.

The Commission on Chemical Kinetics Begins its Work

The Commission on Chemical Kinetics (I.4) was constituted during the past two years and held its first meetings at the Lyon General Assembly. Its chairman is Prof. K. J. Laidler (Canada) and its Secretary, Prof. J. Villiermaux (France).

The Commission at once established two Subcommittees. The first, the Subcommittee on Symbolism and Terminology in Chemical Kinetics (Chairman: K. J. Laidler), will continue the work of a previous subcommittee which dealt with the same general topic and which reported its conclusions in 1981. The present Subcommittee will deal with a number of fundamental problems in kinetics, such as the treatment of various types of reactions that occur in open systems (the previous reports were confined to closed systems). It will also consider some important topics relating to photochemistry and radiation chemistry, and will suggest a standardization of terminology in reaction dynamics. It will investigate the formulation of rate equations when there are volume changes and when activity coefficients have to be taken into account. The question of the rate-determining (rate-controlling or rate-limiting) step in composite reaction mechanisms is an important one in many branches of chemistry, and will be given careful consideration by the Commission.

A number of short reports on these topics will be prepared in the near future, and after they have been fully discussed and suitably revised they will be submitted for publication in *PAC*. Some of these reports will constitute a modification or expansion of items in the reports of the the previous Subcommittee (*PAC*, Vol. 53, pp. 753–771, 1981). The report, "Symbolism and terminology in chemical kinetics", will later be revised and somewhat enlarged in the light of this work.

The second Subcommittee is on Gas Kinetic Data Evaluation for Tropospheric Chemistry (Chairman:

J. Alistair Kerr). This Subcommittee will extend the work of a previous Committee on Data for Science and Technology (CODATA) group that considered reactions important in the atmosphere. The proposed study of reactions in the troposphere should make an important contribution to dealing with the problem of acid rain. This Subcommittee, which would consist of 8–10 members active in the evaluation of kinetic data, would hope to prepare a detailed compilation of data within the next two years.

The new Commission on Chemical Kinetics should play a useful role in collaborating with a number of other Commissions that are concerned with kinetic problems. To that end the Commission held joint meetings with four other commission, and discussed a number of topics of mutual interest. These meetings have helped in the formulation of future projects for the new Kinetics Commission.

K. J. Laidler and J. Villiermaux

Projects on naming transformations and on symbolizing reaction mechanisms approach completion

Over the past two years the main efforts of the Commission on Physical Organic Chemistry (III.2) have been devoted to two major projects, naming transformations and symbolizing reaction mechanisms. The draft reports of a number of working parties on naming different types of transformations — attachments and detachments, substitutions, additions and eliminations, rearrangements, insertions and extrusions, couplings and uncouplings, ring openings and closings, and complex transformations — have all been brought together into a single set of rules and these will shortly be submitted to referees in the first stage of the publication procedure.

The work on symbolizing reaction mechanisms is

further advanced. Two systems have been developed, one for simple descriptive use designed to replace the Ingold system, which is becoming increasingly inadequate and subject to arbitrary and inconsistent modifications, and the other to enable the detailed description of an organic reaction mechanism to be represented in a linear string intelligible both to the eye and to the computer. Both reports have been submitted to referees and, when their comments have been incorporated in the light of discussions at Lyon, they will be forwarded to the Division President for transmission to the

Interdivisional Committee on Nomenclature and Symbols (IDCNS) and early publication in *PAC*.

The meetings of the Commission in Lyon were preceded by meetings of the joint working parties on stereochemical terminology and on the naming of classes of organic compounds and groups. Joint meetings were held later with the Commission on Photochemistry (III.3) and with the Commission on Kinetics (I.4) together with Commission III.3.

The next meeting will be held in Tokyo, Japan, 21–23 August 1986.

R. A. Y. Jones

New Working Party on liquid crystalline polymers

The Commission on Polymer Characterization and Properties (IV.2) held lively meetings in Lyon. They were attended by six Titular members, four Associates, one National Representative, seven Members of the Macromolecular Division, three invited Observers, one of whom was a “young observer” from the USA and one other observer. The meetings were devoted to hearing, and questioning, the progress reported from its five Working Parties and from the individuals charged at Lyngby with paving the way for two new Working Parties. Longer term possibilities for the future were also discussed.

Working Party IV.2.1 on “The structure and properties of commercial polymers” has been growing from strength to strength and the work being carried out in its Sub-Groups which meet in Japan and Eastern Europe is most impressive. It was disappointing to hear, however, that other scientists from Southeast Asia were having difficulty in establishing contact with the Sub-Group meeting in Japan. We trust this difficulty will soon be remedied in the true spirit of IUPAC. Sub-Group IV.2.1.3 on “Defects in the molecular structure of PVC . . .” has finished its work. This is summarized in a paper in *PAC*.

Working Parties IV.2.2 and IV.2.3 on “Molecular characterization and supported polymer films” reported consistent progress; Sub-Group IV.2.2.1 on Polyelectrolytes is making steady progress and Sub-Group IV.2.2.2 on the “Characterization of rubber” will, it is hoped, be reconvened under a new Chairman though Sub-Group IV.2.3.1 on “Polymer surfaces” appear to have continuing difficulty in establishing collaborative work . . . and this in a significantly important field.

The first report from Working Party IV.2.4 on “Thermal properties” is in a final drafting stage. The work of 16 collaborating laboratories, some of which produced 100 page reports, has been condensed to 30 pages! New projects are being started and perhaps two of these will lead to the formation of Sub-Groups.

The Working Party IV.2.5 on “Kinetic parameters in free-radical polymerization” has concluded its experimental work on methyl methacrylate (MMA) and two reports are planned. Because of the experimental delays experienced in this first programme new work is to be concerned with “Com-

puter modelling of free radical polymerization” and Dr Reichert, Technical University, Berlin has been asked to develop collaborative work in this area. If this succeeds over the next two years the life of IV.2.5 will be extended at the next General Assembly.

The Commission decided unanimously to inaugurate a new Working Party IV.2.6 on “Liquid crystalline polymers”, after hearing reports of the great interest established in this topic from Dr B. Anderson and Prof. N. Platé. Prof. Platé was asked to act as convenor of the inaugural meeting of this Working Party using, primarily, a list generated by Prof. R. Lenz.

Prof. Bamford reported that the progress made by the embryonic Working Party on “The interaction of man-made polymers with living systems” included collaborative experimental work. Some 34 people had wished to attend a meeting in June. Nineteen were present. In the light of this evidence the Commission had no hesitation in formalizing this Working Party as IV.2.7 and in electing its chairman, Prof. M. Jozefowicz, Université Paris-Nord, as a Titular Member.

No other topics of burning importance (apart perhaps from flammability!) emerged during a discussion but it is possible that cases may be presented over the coming biennium to warrant attempting to set up Working Parties on electrical conduction, photoactive polymers, environmental durability and permeability.

The net result of all this effort is that, over the last two years, the work on 12 papers has been completed, (three published, five in press, two in final draft and two to be prepared). In addition six papers have been published in the *Journal of Vinyls Technology*.

On the retirement of both Chairman and Secretary of the Commission (Dr P. L. Clegg and Prof. R. E. Wetton) it is most encouraging to report that exceptionally good hands have been found to look after the Commission's affairs in the future. The Chairman will be Prof. Michel Mandel, Leiden and the Secretary Mr John M. Cann, BP Chemicals Ltd, Grangemouth, Scotland.

P. L. Clegg

(*Commission News continued on p. 30*)

(Subject to approval by National Adhering Organizations)

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Recommended Changes in atomic weight values

At the Lyon General Assembly, the Commission on Atomic Weights and Isotopic Abundances recommended the following changes in the values for the IUPAC Standard Atomic Weights:

Beryllium	from	9.01218 ± 1	to	9.012182 ± 3
Nitrogen	from	14.0067 ± 1	to	14.00674 ± 7
Fluorine	from	18.998403 ± 1	to	18.9984032 ± 9
Neon	from	20.179 ± 1	to	20.1797 ± 6
Sodium	from	22.98977 ± 1	to	22.989768 ± 6
Magnesium	from	24.305 ± 1	to	24.3050 ± 6
Aluminium	from	26.98154 ± 1	to	26.981539 ± 5
Phosphorus	from	30.97376 ± 1	to	30.973762 ± 4
Chlorine	from	35.453 ± 1	to	35.4527 ± 9
Scandium	from	44.95591 ± 1	to	44.955910 ± 9
Manganese	from	54.9380 ± 1	to	54.93805 ± 1
Cobalt	from	58.9332 ± 1	to	58.93320 ± 1
Germanium	from	72.59 ± 3	to	72.61 ± 2
Arsenic	from	74.9216 ± 1	to	74.92159 ± 2
Yttrium	from	88.9059 ± 1	to	88.90585 ± 2
Niobium	from	92.9064 ± 1	to	92.90638 ± 2
Rhodium	from	102.9055 ± 1	to	102.90550 ± 3
Silver	from	107.8682 ± 3	to	107.8682 ± 2
Cadmium	from	112.41 ± 1	to	112.411 ± 8
Iodine	from	126.9045 ± 1	to	126.90447 ± 3
Xenon	from	131.29 ± 3	to	131.29 ± 2
Caesium	from	132.9054 ± 1	to	132.90543 ± 5
Barium	from	137.33 ± 1	to	137.327 ± 7
Lanthanum	from	138.9055 ± 3	to	138.9055 ± 2
Cerium	from	140.12 ± 1	to	140.115 ± 4
Praseodymium	from	140.9077 ± 1	to	140.90765 ± 3
Europium	from	151.96 ± 1	to	151.965 ± 9
Terbium	from	158.9254 ± 1	to	158.92534 ± 3
Holmium	from	164.9304 ± 1	to	164.93032 ± 3
Thulium	from	168.9342 ± 1	to	168.93421 ± 3
Hafnium	from	178.49 ± 3	to	178.49 ± 2
Gold	from	196.9665 ± 1	to	196.96654 ± 3
Thallium	from	204.383 ± 1	to	204.3833 ± 2
Bismuth	from	208.9804 ± 1	to	208.98037 ± 3

The reasons for these changes and the detailed table of Standard Atomic Weights will appear in the Commission's full biennial report, to be published in *PAC*.

Two projects successfully completed by Analytical Nomenclature Commission

The status of Division Projects was first discussed at the Lyon meeting of the Commission on Analytical Nomenclature (V.3). It was noted with satisfaction that the two most successful Division Projects (Compendium, Harmonization of Collaborative Analytical Studies) were completed by members of our Commission.

The new edition of the Compendium (Orange Book), was compiled by H. Freiser. Members of the Commission has the opportunity of examining the camera-ready copy.

The 2nd Symposium on the Harmonization of Collaborative Analytical Studies, held on 25–27 October 1984 in Washington DC, was organized by W. Horwitz. The excellent organization and high scientific standard were praised and acknowledged by those taking part. G. Svehla lectured on the role of IUPAC and Commission V.3 in particular in

fostering the aims of the Symposium. The further role of the Commission, in liaison with the new Division Working Party on the Harmonization of Interlaboratory Studies was discussed in detail.

All the Commission Projects were reviewed, including joint Projects with other Commissions. Good progress was reported in most of these, though in certain cases members noted their disappointment on the lack of progress. Five projects have been finalized and three new projects were initiated. The feasibility of three other projects will be studied in the forthcoming months and will be initiated in due course.

A full-day interim meeting of the Commission is planned for 12 December 1986. Most Titular and some Associate Members are expected to attend.

G. Svehla

SCOPE for solving problems of the environment

The Scientific Committee on Problems of the Environment (SCOPE) is an international non-government, non-profit organization established in 1969 to advance knowledge of the influence of humans on their environment as well as the effects of these environmental changes upon people, their health and their welfare. Particular attention is paid to those influences and effects which are either global or shared by several nations. SCOPE also serves as a non-governmental interdisciplinary and international council of scientists and as a source of advice for the benefit of governments and intergovernmental and non-governmental bodies with respect to environmental problems. This report looks at some of the activities and publications of SCOPE.

Introduction

SCOPE is one of a number of committees established by the International Council of Scientific Unions (ICSU). The membership of ICSU includes representatives from 68 National Academies of Science, 18 International Unions — including IUPAC — and 12 other bodies called Scientific Associates. To cover multidisciplinary activities which include the interests of several unions, ICSU has established 10 scientific committees, of which SCOPE, founded in 1969, is one.

SCOPE maintains close working relations with IUPAC and a number of other ICSU unions and committees as well as UN organizations such as UNESCO, UNEP, WHO and WMO.* In addition several national SCOPE committees undertake activities on a national scale for which SCOPE itself has no direct responsibility. Currently, representatives of 36 member countries and 17 Unions and Scientific Committees participate in the work of SCOPE.

The official IUPAC representative at SCOPE meetings is Dr W. Klein of the Frannhofer-Institut, Schmallenberg, FRG. Dr Klein is a Titular member of the IUPAC Commission on Pesticide Chemistry (VI.5) and an Associate member of the Commission on Chemical Kinetics (I.4). He attended SCOPE's VIth General Assembly which was held in Washington DC, USA, 9–13 September 1985.

SCOPE's mandate is to assemble, review and assess the information available on man-made environmental changes and the effects of these changes on Man; to assess and evaluate the methodologies of measurement of environmental parameters; to provide an intelligence service on current research; and by the recruitment of the best available scientific information and constructive thinking to establish itself as a corpus of informed advice for the benefit of centres of fundamental research and of organizations and agencies operationally engaged in studies of the environment. Particular attention is directed to the needs of developing countries.

The committee is governed by a General Assembly, which meets every three years. Between such meetings its activities are directed by the Executive Committee. Funds to meet SCOPE expenses are provided by contributions from SCOPE National Committees; an annual subvention from ICSU (and through ICSU, from UNESCO); an annual subvention from the French Ministère de l'Environnement



Prof. J. W. M. La Rivière (Netherlands),
President of SCOPE.

et du Cadre de Vie; contracts with UN Bodies, particularly UNEP, and grants from foundations and industrial enterprises.

SCOPE's first task was to prepare a report on Global Environmental Monitoring. This was published in 1971 and submitted to the United Nations Conference on the Environment in Stockholm in 1972. In order to draw attention to the environmental problems in developing countries SCOPE organized a symposium on Environment and Development in Nairobi in 1974 which dealt with the problems of Mankind and of the effective utilization of natural resources. It also looked at forms of actions and organizations to resolve these problems. ICSU then directed SCOPE to identify the environmental issues requiring the most urgent interdisciplinary scientific and international attention. As a result, SCOPE introduced a report on the state of the environment, entitled "Environmental issues" in 1976.

Current SCOPE projects

Biogeochemical cycles

SCOPE started its international interdisciplinary project on the Biogeochemical Cycles with activities aimed at understanding each of the major cycles

separately with a view to preparing a basis for effective studies of their interactions. Special attention was also given to assessing the magnitude of man's interactions with the biogeochemical cycles. The project was initiated with a workshop on "Nitrogen, Phosphorus and Sulphur — Global Cycles" and the results were published as SCOPE Report No. 7 in 1976.

The Nitrogen Unit. As a follow-up of some of the recommendations from this first workshop, the SCOPE/UNEP International Nitrogen Unit was set up at the Royal Swedish Academy of Sciences in Stockholm in 1978. The unit collected data critical for the assessment and synthesis of knowledge of the nitrogen cycle. A major portion of the activities of the unit involved compilation and assessment of information concerning nitrogen cycling in tropical and sub-tropical ecosystems. Three regional workshops were organized in West Africa, Southeast Asia and Latin America including the Caribbean. The reports from these meetings have been published. An international meeting on "Terrestrial Nitrogen Cycles Processes, Ecosystem Strategies and Management Impacts" was organized in 1979 and the proceedings were published in 1981 as Ecological Bulletins Vol. 33. The results from this project also include a regional study of nitrogen cycling in West Africa and an updated report on the global nitrogen cycle. The series of regional studies on nitrogen cycling was completed with an international workshop held in Denmark in June 1985. This focused on nitrogen cycling in coastal and marine environments.

The Carbon Unit. The SCOPE/UNEP International Carbon Unit was the second unit to be set up. It consisted of a main unit at the University of Hamburg and a sub-unit at Stockholm, both working in close collaboration with several institutes working in the field in 1979. SCOPE's first comprehensive study on the global carbon cycle was published as SCOPE Report No. 13. One workshop considered the present status of carbon cycle modelling and the results were published as SCOPE Report No. 16 in 1981. A further report on "The Role of Terrestrial Vegetation in the Global Carbon Cycle" has recently been published (see below). Special emphasis was also given to problems of carbon transport in the world's rivers. The first comprehensive report was published by the Carbon Unit in Hamburg in 1982.

The data gathered during the third campaign of the "Transport of Carbon and Minerals in Major World Rivers" project were presented and discussed at the workshop held in Caracas in March 1984. The project was extended to include major biogeochemical elements such as sulphur, nitrogen and phosphorus. Work on sediment load and water discharge was also included in the data collection. Some scenarios on the interaction of biogeochemical elements, as well as remote sensing studies have also been developed. The fourth international workshop on "Transport of Carbon and Minerals in Major World Rivers" was held in Tianjin, China, in May 1985. Besides this main "Transport in Rivers" project which terminates this year, the SCOPE/

UNEP Carbon Unit in Hamburg has initiated a three-year study of the flux of carbon and detritus from land to sea in the area of the German Bight and the southern part of the North Sea. It has organized two international workshops on Marine Biogeochemistry (Goa, India — October 1984) and on Black Shales (Hamburg, FRG, June 1985). Preparations are under way for a proposed five-year study (1986–90) on "Global Carbon and Nutrient Cycling in Lakes and Estuaries".

Carbon dioxide. During the 5th SCOPE General Assembly in 1982, a number of proposals for new SCOPE projects in the area of biogeochemical cycles were discussed. A major study of the impact of climatic change on terrestrial ecosystems was approved. This constitutes one component of a project on the development of a scientific basis for assessing the impact of an increased carbon dioxide concentration on the interaction between climate and the biosphere. The project, executed by the International Meteorological Institute (IMI) in Stockholm, represents the SCOPE contribution to the joint WMO/ICSU/UNEP programme for the assessment of CO₂ impact on the environment and human activities. After a conference on "the Sensitivity of Ecosystems and Society to Climate Change" held in Villach in September 1983, meetings of experts have addressed (a) the climate responses to an increased concentration of CO₂ and (b) the carbon cycle and the projection of future concentrations of atmospheric CO₂.

Studies presently under way relate to (1) requirements for a satisfactory model of the global carbon cycle, (2) testing of the combined sensitivity of climate and impact models. In May 1984 the IMI organized, jointly with WMO, an expert meeting on the reliability of crop-climate models for assessing the impacts of climatic change and variability. A comparison of several crop simulation models, using standard climate scenarios, has been undertaken as a pilot study to test procedures for expanded, longer term crop-climate model evaluation activities. Other expert meetings were organized by the IMI to examine the consequences of a climate change for boreal forests and to review the problem of the rate of released CO₂ as a function of future energy developments. A series of monographs as well as the final SCOPE report on the global CO₂ problem are presently being finalized.



Prof. W. Klein
(FRG), IUPAC
representative to
SCOPE.

The Sulphur Unit. The SCOPE/UNEP Sulphur Unit was established at the Institute of Biochemistry and Physiology of Microorganisms of the USSR Academy of Sciences in Pushchino. This unit has assisted in the preparation of a comprehensive report on the global sulphur cycle. The unit continues to work on an appraisal of the processes involved in the biogeochemical sulphur cycle. This includes an analysis of sulphur in the lithosphere, soil, water, atmosphere, continental basins and in the oceans. An international workshop on "the Evolution of the Global Sulphur Cycle" was held in USSR, in July–August 1984. This concentrated mainly on (a) the evolution of the sulphur cycle in geological times; (b) the pre-industrial sulphur cycle and the changes due to anthropogenic influence in recent times; (c) the interaction of sulphur, nitrogen, carbon and oxygen cycles in sulphur-dominated ecosystems. Preparations have been undertaken for a proposed new study (1986–88) on the natural and anthropogenic sulphur cycle in the hydrosphere.

Metal cycling. As a result of the SCOPE General Assembly in 1982, a project on the biogeochemical cycling of metals has been formulated. The first metal cycling workshop held in Canada, in September 1984, focused on the cycling of arsenic, cadmium, lead and mercury. The relative anthropogenic sources were considered and quantified when possible; major knowledge gaps, especially at the regional level, were identified and discussed.

Acidification in tropical countries. The first phase of *Acidification in Tropical Countries* study was initiated this year. SCOPE is undertaking this new study to investigate the degree to which acidification is already a problem in tropical countries; to assess the potential for occurrence of harmful effects in the future if emissions of sulphur and nitrogen oxides were to increase and identify susceptible areas in relation to soils and ecosystems — to investigate the need for monitoring the status of the environment including air, water, soil and vegetation in tropical countries so that baseline values are established and possible changes detected at an early state — to stimulate research and training related to acidification in tropical countries.

Ecotoxicology

SCOPE sponsors a number of activities aimed at advancing the understanding of the fate and effects of chemicals in the environment. After the publication of SCOPE 12 a basic report on "Principles of ecotoxicology", a Scientific Advisory Committee was established to explore particular aspects of the problem, namely

- (a) the assessment of the effects of pollutants at the ecosystem level and
- (b) the appraisal of tests to predict the environmental behaviour of chemicals

Reports on these subjects were prepared by various authors and published as SCOPE 22 and 25.

In addition, a Scientific Group on Methodologies for the Safety Evaluation of Chemicals (SGOMSEC) has been established under the sponsorship of

SCOPE, the World Health Organization (IPCS) and UNEP to undertake the evaluation of current and new methodologies for safety evaluation both in respect of the effects on human health and the effects on non-human targets in the natural environment.

The first report was on methods for assessing the effects of chemicals on reproductive function: SGOMSEC 1A mammals; 1B other life forms. The second study involved three methodologies: SGOMSEC 2A procedures for estimating exposures to chemicals; 2B the quantitative estimation of risks to human health; 2C the evaluation of tests to predict chemical injury to plants, animals and ecosystems. The product of these studies are monographs evaluating the state-of-the-art in methods, the gaps in our knowledge and advantages and disadvantages of available techniques.

After a workshop held in UK in August 1983, a report on "Methods for estimating, predicting and interpreting health effects of simultaneous and sequential exposure to several chemicals" (SGOMSEC 3) was prepared.

The fourth SGOMSEC workshop was held in Ottawa in August 1984. It concentrated on the positive value of short-term toxicity tests for non-genotoxic effects. SGOMSEC 5 was held in Mexico in August 1985, and focused on methodologies for the assessment of exposure to chemicals of humans and non-human biota — including measurements of levels near the exposed organism, modelling and the actual assessment in biological material.

A further project on Ecotoxicology in Hot and Cold Climates was implemented in 1984–85. The aim of the study is to develop ecotoxicological principles that will be applicable to non-temperate regions in order to assess the fate of environmental chemicals and their effects in such areas. The study concentrates on data available from the tropical, arid, sub-polar and high mountain regions.

Coastal chemistry

Increasingly coastal waters are being used as receptacles for Man's wastes. The chemical environment of coastal zones is thereby being changed in ways that are as yet poorly understood and that have long-term deterioration effects. Under the sponsorship of SCOPE, a group of scientists who are specialists in studies of coastal zones are evaluating methods and strategies for the detection and measurement of such chemical changes.

The Mussel Watch concept is one approach that has been adopted by several countries in recent years. Under the guidance of a Scientific Advisory Committee, the group has attempted to formulate a scientific ratio for the discharges of wastes into coastal waters in order to provide for long-term protection. The Mussel Watch II workshop was held in Honolulu, Hawaii in November 1983.

Environmental Consequences of Nuclear War (ENUWAR)

The ENUWAR project undertaken in 1983 is now under completion. Its aims and mandate were to assess global climatic and biological effects of

several scenarios of nuclear exchange. The project developed a series of international workshops, each concentrating on a specific aspect but building also on the discussions and conclusions of the previous ones. In addition to the six earlier workshops held, the following meetings have taken place since June 1984: (a) Cloud-physics and scavenging mechanisms for particulates — Tallin, August 1984; (b) Ground-water contamination from fallout — Delft, October 1984; (c) Radiation effects on human and non-human biota — Paris, October 1984; (d) Ethics and morality — Bellagio, November 1984; (e) Agriculture response to nuclear war — Colchester, January 1985; (f) Human impacts — Hiroshima, February 1985; (g) Atmospheric uncertainties relating to nuclear winter predictions — London, February 1985; (h) Ecological effects — Toronto, March 1985; (i) Effects in the southern hemisphere — Melbourne, March 1985; and (j) Effects on tropical ecosystems and agriculture — Caracas, April 1985.

A synthesis and editing workshop was held in UK in June 1985. Two synthesis scientific volumes are being prepared to deal respectively with (a) the atmospheric and climate consequences of nuclear war, and (b) the biological consequences and the ecosystem response. A summary popular version is also in preparation.

The SCOPE ENUWAR terminated with a report to the SCOPE General Assembly in September.

Other SCOPE projects

In addition to the project described above, SCOPE is also engaged in the following projects:

- Land transformation
- Dynamics of continental wetlands
- Climatic impact assessment
- Ecology of biological invasions
- Clearinghouse of groundwater modelling

SCOPE reports

Since 1971, SCOPE has published over 23 reports. A list of available reports is shown below in the Appendix. Details of SCOPE reports 19, 20 and 21 have already appeared in *Chemistry International* (see *CI*, Vol. 6, No. 6, pp. 49–50, 1984 and *CI*, Vol. 7, No. 2, p. 37, 1985).

SCOPE Report 23: The role of terrestrial vegetation in the global carbon cycle measurement by remote sensing

This book examines the role of remote sensing in measuring changes in terrestrial vegetation that are significant in the global carbon cycle. Well-known experts discuss various techniques, including classification of plant communities, measurement of soil organic matter and remote sensing by aircraft and satellite, which can be used to estimate changes that may affect the CO₂ concentration in the atmosphere. The use of these techniques in several case studies is described, and future prospects for the role of remote sensing are discussed. This book was developed from a SCOPE conference in Woods Hole in 1979. Further analyses since that time have led to advances that have been incorporated into this summary.

The book (xvii + 247 pages) is edited by G. M. Woodwell and published by John Wiley & Sons Ltd, Chichester, UK. ISBN 0 471 90262 4.

SCOPE Newsletters

The SCOPE Secretariat publishes a newsletter three times a year. The publication of this newsletter is financially supported by the French Ministry of the Environment. Recent SCOPE Newsletters have already received attention in *Chemistry International* (see *CI*, Vol. 6, No. 2, p. 32, 1984; No. 6, p. 49 and Vol. 7, No. 2, pp. 36–37, 1985).

SCOPE Newsletter No. 23, March 1985. This issue includes reports of workshops, meetings and symposia relating to the SCOPE programme on "Ecology of Biological Invasions". The Newsletter also includes a report on the SCOPE project entitled "Ecotoxicology and Climate".

SCOPE Newsletters are distributed free of charge through the SCOPE Secretariat and the National Committees. The address of the SCOPE Secretariat is:

51 Boulevard de Montmorency,
75016 Paris, France.

Telephone: +33 (1) 4525 04 98 Telex: 630 553 F



Appendix I: Available SCOPE reports

- SCOPE 2 : *Man-made Lakes as Modified Ecosystems*, 1972, 76 pp.
SCOPE 5 : *Environmental Impact Assessment: Principles and Procedures*, 2nd edn, 1979, 208 pp.
SCOPE 7 : *Nitrogen, Phosphorus and Sulphur: Global Cycles*, 1975, 192 pp. (available from the Publishing House, Swedish Natural Science Research Council, Wenner-Gren Center, Box 6710, S-113 85 Stockholm, Sweden)
SCOPE 8 : *Risk Assessment of Environmental Hazard*, 1978, 128 pp.
SCOPE 9 : *Simulation Modelling of Environmental Problems*, 1978, 128 pp.
SCOPE 10 : *Environmental Issues*, 1977, 242 pp.
SCOPE 11 : *Shelter Provision in Developing Countries*, 1978, 112 pp.
SCOPE 12 : *Principles of Ecotoxicology*, 1979, 372 pp.
SCOPE 13 : *The Global Carbon Cycles*, 1979, 528 pp.
SCOPE 14 : *Saharan Dust: Mobilization, Transport, Deposition*, 1979, 320 pp.
SCOPE 15 : *Environmental Risk Assessment*, 1980, 184 pp.
SCOPE 16 : *Carbon Cycle Modelling*, 1981, 390 pp.
SCOPE 17 : *Some Perspectives of the Major Biogeochemical Cycles*, 1981, 175 pp.
SCOPE 18 : *The Role of Fire in Northern Circumpolar Ecosystems*, 1983, 322 pp.
SCOPE 19 : *The Global Biogeochemical Sulphur Cycle*, 1984, 470 pp.
SCOPE 20 : *Methods for Assessing the Effects of Chemicals on Reproductive Functions* (SGOMSEC 1), 1983, 541 pp.
SCOPE 21 : *The Major Biogeochemical Cycles and their Interactions*, 1983, 532 pp.
SCOPE 22 : *Effects of Pollutants at the Ecosystem Level*, 1984, 443 pp.
SCOPE 23 : *The Role of Terrestrial Vegetation in the Global Carbon Cycle: Remote Sensing*, 1984, 247 pp.

Forthcoming reports

- SCOPE 24 : *Noise Pollution*, 1985
SCOPE 25 : *Appraisal of Tests to predict the Environmental Behaviour of Chemicals*, 1985
SCOPE 26 : *Quantitative Estimation of Risk to Human Health from Chemicals* (SGOMSEC 2), 1985
SCOPE 27 : *Climate Impact Assessment*, 1985

All SCOPE Reports, except No. 7, can be obtained from:
John Wiley & Sons Ltd,
Baffins Lane, Chichester,
Sussex, PO19 1UD, United Kingdom

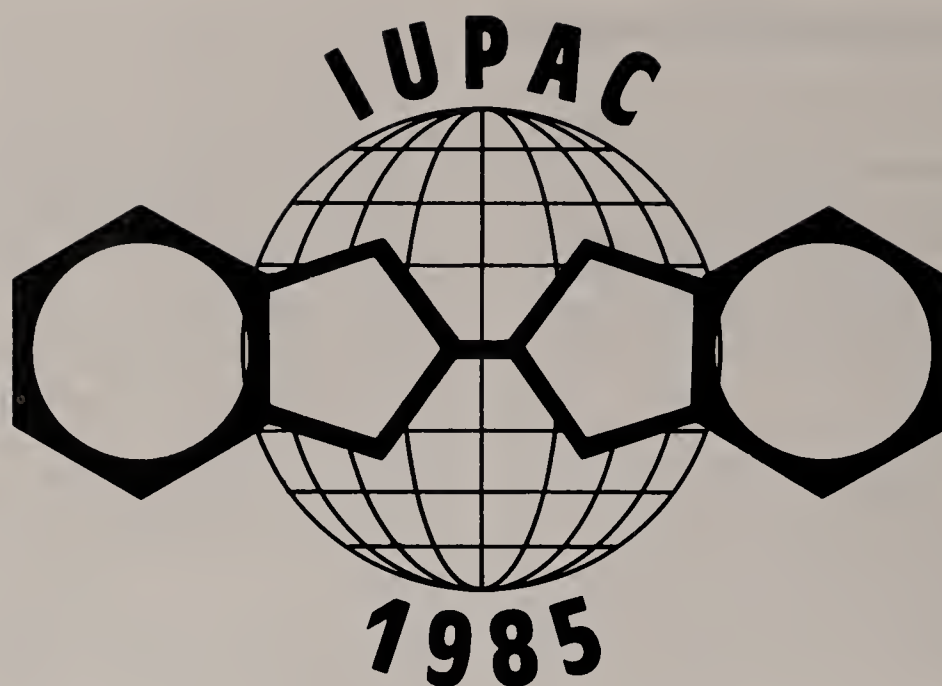
Appendix II: List of abbreviations

ENUWAR	Environmental Consequences of Nuclear War
ICSU	International Council of Scientific Unions
IMI	International Meteorological Institute
IPCS	International Programme on Chemical Safety
SCOPE	Scientific Committee on Problems of the Environment
SGOMSEC	Scientific Group on Methodologies for the Safety Evaluation of Chemicals
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization
WMO	World Meteorological Organization

More IUPAC creatures

The creatures shown on p. 19 have now been identified as disc-like mesogenic units. The animals are particularly fond of liquid crystals and can sometimes be observed as side groupies attached to the main chain polymers of polysiloxanes. They appeared in a paper entitled

'Synthesis, structure and properties of liquid crystalline polymers', *PAC*, Vol. 57, pp. 1009–14, 1985. Our correspondent from Commission VI.5 reports that more animals are, in fact, insects (since they have six legs). He adds that further infestation at this time of the year is unlikely.



The Manchester Congress

IUPAC held its 30th Congress on the campus of the University of Manchester Institute of Science and Technology (UMIST) 8–13 September 1985. This was the first time in over 20 years that the Congress had been held in the UK. It was organized, on behalf of IUPAC, by the Royal Society of Chemistry (RSC).

Over 200 papers and 400 posters from more than 20 countries were presented at the Congress. There were nearly 1600 participants from exactly 50 countries. Amongst the many distinguished speakers were three Nobel laureates — Lord Todd, Sir George Porter and Sir Derek Barton — and also Prof. Yuri Ovchinnikov, Director of the Shemyakin Institute of Biorganic Chemistry of the USSR Academy of Science.

After introductory and welcoming speeches by Prof. Sir Ewart Jones, Chairman of the Congress Executive Committee, Prof. R. O. C. Norman, RSC President and Prof. C. N. R. Rao, IUPAC President, Lord Todd formally opened the Congress at the Palace Theatre on Monday 9 September. Sir George Porter then delivered a lecture on “Chemistry’s Cornucopia” in which he discussed whether chemistry can provide chemical fuels to meet long-term needs on a renewable basis.

The Congress included an exhibition of scientific books and an exhibition mounted by the Greater Manchester Museum of Science and Industry entitled “200 years of Manchester Science”. There were also demonstrations of new electrochemical sensors and a variety of other equipment.



Prof. Sir Ewart Jones welcomes participants at the Manchester Congress.

Prof. Rao's opening remarks

Sir Ewart Jones, Prof. Norman, Lord Todd, Sir George Porter, ladies and gentlemen. I am delighted to be here this morning to welcome you all on behalf of the International Union of Pure and Applied Chemistry. IUPAC is the international representative body for chemistry recognized by

science academies and chemical societies of the world. The national academies and the national committees for chemistry are members of IUPAC.

IUPAC is recognized as the authority on atomic weights, chemical nomenclature, symbols, terminology and so on. The Union also provides valuable



Prof. Rao speaking at the Manchester Congress.

advice to international organizations on chemical matters.

IUPAC is now 66 years old. Around 1500 chemists from over 50 countries are engaged in its work. IUPAC has seven Divisions (Physical, Inorganic, Organic, Macromolecular, Analytical, Applied and Clinical) and each Division works through several Commissions devoted to different aspects of the concerned area. For example, the Physical Chemistry Division has Commissions on spectroscopy, molecular structure, electrochemistry, thermodynamics, kinetics and surface chemistry. The Commissions bring out most useful reports on aspects of current interest to the profession.

The Union has some important committees. The Committee on Teaching Chemistry (CTC) has done much to the cause of chemical education in the international scene. There is a Committee on Chemical Industry (COCI). I must specially mention the CHEMRAWN Committee. CHEMRAWN stands for Chemical Research Applied to World Needs. CHEMRAWN conferences have been most successful and have dealt with pressing problems of

"I urge chemists of the world to become Affiliates of the Union, contribute to the work of the Union and enable it to become truly international."

Mankind, especially relevant to the developing world. It has had conferences on natural resources and food and will soon have conferences on health, oceans and high technology materials. I believe that the CHEMRAWN activity has not only increased the visibility of chemistry but has also contributed to the airing of real issues.

IUPAC has many international company associates who participate in the Union activities.

IUPAC has just initiated the Affiliate Membership Scheme to maximize participation of chemists in the affairs of the Union. The membership hardly costs US-\$7.50 plus local administration costs and the Affiliates receive the IUPAC news journal, *Chemistry International (CI)*. I urge chemists of the world to become Affiliates of the Union, contribute to the work of the Union and enable it to become truly international.

One of the successful activities of the Union has been to sponsor important symposia, especially the biennial Congresses of Pure and Applied Chemistry. Today, we are here at the 30th IUPAC Congress. The Congress has enabled chemists from all parts of the world to come together. IUPAC is becoming increasingly conscious of the important role of chemists in showing problems affecting humanity at large, including the developing world. It believes that chemists have much to contribute not only to the well-being of Mankind in this disparate world, but also in promoting the chemical comments as an important force in society. May I request you, ladies and gentlemen, to help the Union in such efforts. Thank you.

The scientific programme

The scientific programme of oral and poster presentations at the Manchester Congress consisted of eight sections:

1. Analytical
2. Education
3. Industrial
4. Inorganic
5. Organic/Life Sciences
6. Organic/Dyestuffs
7. Physical
8. Physical/Analytical

To give you a flavour of the Congress we print below the summaries and abstracts of a representative sample of the oral and poster presentations. Further material from the Congress will appear in *Chemistry International* next year.

University Chemistry — The Role of the Laboratory in a Developing Country

Prof. R. S. Ramakrishna (University of Colombo, Sri Lanka)

In most developing countries, the university is the only source of tertiary education for secondary school students. Student numbers, lack of motivation and heavy financial outlay are some of the more important causes for the deterioration in the quality of the laboratory curriculum. Teaching of chemistry as an experimental science is becoming so expensive that most developing countries are beginning to reduce the content of laboratory instruction.



Prof. R. S. Ramakrishna.

Improvisation, integrated science teaching and learning from experience are some of the developments in the school scene. Little has however been accomplished at the university level. Developing countries continue to model their curriculum on international standards, with little or no relevance to the local situation. It is against this backdrop of university chemistry in a developing country, that the role of the laboratory in the teaching of chemistry requires a fresh look.

The lecture discussed the aims, assumptions and realizations of laboratory work in the teaching of chemistry at university in a developing country. The content, objectives and organization of laboratory curricula in analytical chemistry were also discussed. The need for motivation, self-reliance, problem-solving attitudes and interaction with the lecture content was stressed.

Personal experiences of the role of the laboratory in several developing countries such as Sri Lanka, Ghana and Jordan were presented. The lecture focused on the need to formulate proposals for university chemistry "which concentrated more on the general needs of the majority of students and less extensively on the vocational needs of the few".

The Myth of Scarcity

Mr M. Singer (Potomac Organization, USA)

World population is still increasing rapidly and will double or triple before it stabilizes. Furthermore average income, which is an even greater influence on the amount of resources consumed, is rising even faster than population, and is likely to continue to rise rapidly. Nevertheless the popular idea that the world is doomed to face major raw material scarcity problems is clearly wrong.

This conclusion is the result of careful studies by a number of experts. The well-known documents such



as the Report to the Club of Rome and the Global 2000 Report, which suggest that the physical condition of the world is becoming worse, and that radical change is required to prevent disaster, do not deal with the evidence or with the serious arguments relevant to their contentions.

Even in the US only US-\$130 of raw materials — other than food and fuel — are consumed per person each year. Most of this is common material like iron, aluminium, clay, and stone. No conceivable shortage could increase the price of these materials or their substitutes enough to seriously reduce people's income.

There is enough potentially arable land to grow the food for at least 20 or 30 billion people using only continued application of the science upon which agriculture is based today. In other words, no scientific breakthroughs are required to feed many more people than are expected, using only conventional foods.

And we know that we can always have all the energy we need, because even if all else fails, a few per cent of solar energy striking the Earth would be ample for all of our needs, and the costs of using it would not be so many times higher than energy costs today that we could not afford to pay them.

Electrochemical Synthesis of Highly Conducting Transition Metal Complexes derived from Sulphur Ligands

Dr P. Cassoux (CNRS, France)

The role of various electrochemical techniques in both the analytical and synthetic aspects was emphasized in this lecture. Analytical techniques, such as polarography and cyclic voltammetry are very useful in selecting prospective candidates for study as a source of conducting compounds. In these techniques standard electrodes, or solid composite electrodes as well, may be used. In particular, half-wave redox potential values may be used for determining the relative donor or acceptor strength of component molecules which may be combined for giving conducting donor-acceptor compounds. On the other hand the existence of conducting ion radical salts may be directly detected.

Electrosynthetic techniques have been widely used for preparing highly conducting materials. In most cases, constant current methods have been applied for obtaining single crystals of such materials of suitable size and quality for further study of their physical properties.

In our laboratory, we have applied these analytical and synthetic methods to compounds which show two main characteristic features: (a) these compounds are transition metal complexes; (b) they are derived from ligands containing a large number of sulphur, or selenium, atoms on the periphery of the molecular units. This strategy of incorporating additional sulphur or selenium atoms was designed

for enhancing interchain interaction which is believed to be one of the crucial factors determining the electrical behaviour of low-temperature metallic conductors of superconductors. The results obtained along these lines and, in particular, the synthesis and properties of the first three-dimensional molecular metals were described.

POSTERS

The use of an automatic teaching system (ATS) in the process of teaching chemistry

Prof. E. P. Petryaev *et al.* (Minsk, USSR)

One of the most important ways towards intensification and individualization of teaching is the automatization of some parts of the teaching process based on the Automatic Teaching System (ATS).

In the Belorussian State University named after V. I. Lenin an Advanced Automatic Television Teaching System (ATTS) based on computers of the United Series with expanded didactic capacities is used. The System has 32 specialized display terminals.

In the chemical faculty ATS is used in a dialogical regime in conducting seminars, tests, in teaching students to solve complicated problems of prefixed and stochastic modelling of chemical processes, quantum chemistry, statistic processing of experimental data as well as in teaching first and second year students to solve chemical problems. This work has been conducted since 1975 in courses of inorganic, general, radio-, physical, analytical, organic chemistry and in several special courses.

The main principle of the use of software and methodology was considered in detail in the paper.

Electron-transfer reactions in ruthenium-containing polymer films

Ms S. M. Geraty *et al.* (Dublin, Ireland)

A series of ruthenium-containing metallopolymers has been prepared with the aim of producing materials with possible applications in energy conversion, catalysis or as new electrochemical sensors. When $[\text{Ru}(\text{bpy})_2\text{Cl}_2]$ is reacted with poly-4-vinyl-pyridine, $[\text{Ru}(\text{bpy})_2(\text{PVP})\text{Cl}]^+$ is obtained. With 4-vinyl-pyridine/methylmethacrylate copolymers both $[\text{Ru}(\text{bpy})_2(\text{PVP})\text{Cl}]^+$ and $[\text{Ru}(\text{bpy})_2(\text{PVP})]^{2+}$ can be formed depending on the reaction ratios. Reaction of $\text{Ru}(\text{bpy})_2\text{Cl}_2$ with poly-N-vinylimidazole yields both the mono- and the di-substituted species. The ratio of the products obtained can be determined from cyclic voltammograms of electrodes modified with these materials. The electrochemical behaviour of the polymer-coated electrodes depends on the electrolyte used

and on the nature of the polymer backbone. The oxidation of a Fe^{2+} solution is mediated by the polymer film. The limiting current depends both on the Fe^{2+} concentration and on the film thickness. Koutecky-Levich plots of $1/i_{\text{lim}}$ against $\omega^{-1/2}$ yield a straight line with an intercept which depends on the film thickness.

Production of aluminium sulphate from Egyptian clays: filtration characteristics

Dr I. El-Shawarby *et al.* (Egypt)

One of the vital projects in the economic development plan in Egypt is to manufacture alum from natural local resources to save foreign currency for other development projects.

A preliminary evaluation was made to determine the processing costs of producing aluminium sulphate (alum) from Egyptian clays by leaching with sulphuric acid. This evaluation included the estimation of operating and capital costs as well as recommendations for additional research and development to improve the process. The design of this process was based on experimental data for the leaching step only, other necessary data has been taken from published works. It was thus believed that studying the filtration of such slurries under different conditions using a bench-scale unit would give a better idea about the characteristics of this important step.

Carbazole dyes

Dr J. Polaczek *et al.* (Warsaw, Poland)

The carbazole ring system is present in molecules of many dyestuffs. It is usually either introduced to the dyes as a ready primary carbazole or formed secondarily by closing of its middle pyrrole ring during synthesis of the dye. Since the commercial carbazole as well as its simple derivatives can be supplied by the coal tar industry and the demand on the carbazole dyes may well increase in the near future, an extensive study has been made to compare the common and new routes to the carbazole dyes. The alternative methods for manufacturing the azocarbazole, quinocarbazole, phthaloilcarbazole, carbazolyquinone, carbazolyarylmethane, carbazoly polymethine, and dioxazine dyes are particularly considered.



◀ When Irish eyes are smiling! Four post-doctoral researchers and PhD students who accompanied Prof. Dervilla Donnelly (see *CI*, No. 4, p. 12, 1985) from University College, Dublin to attend the Organic Chemistry/Life Sciences Section at the Congress.

A poster in the Inorganic Section. Ms Ward from Oakland University, Michigan, USA presents a poster of her work with Prof. R. C. Taylor on herpes simplex viruses and platinum complexes.

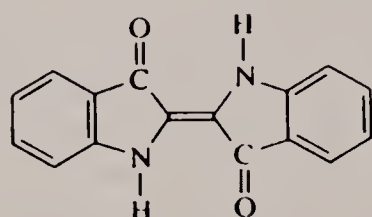


▶ Flying the IUPAC flag. Stephanie Hoyle, who is studying Natural Sciences at Cambridge University and Graeme Jones, a chemistry student at Liverpool University sell IUPAC ties and T-shirts at the Congress.



What's in a name: indigo

Many of you will recognize the skeleton structure used in the logo for the IUPAC Congress in Manchester. It represents an indigoid dye. The following is a typical example of such a dye,



This is the dye indigo which may be obtained from natural sources — when it is often called indigotin. The systematic IUPAC name for this dye or pigment is 3,3'-dioxo-1,3,1',3'-tetrahydro-2,2'-biindolylidene.

The structure was used in the logo because of Manchester's long association with the dyestuffs

industry. From about 1780 Manchester became dominated by mills producing yarn and cloth. The trades and industries upon which cotton manufacture depended also flourished in the town and surrounding districts. In addition demand grew for trades involved in the finishing processes, that is, bleaching and dyeing. In the 1850s a company was started in Manchester to manufacture picric acid, which gave a bright canary yellow colour. Then, in the early 1860s, several commercial methods were developed for printing cotton using dyes such as aniline black, Bismarck brown and Martius yellow. Several Manchester companies became leading manufacturers of dyestuffs. Since 1963 the "fibre reactive" procion group dyes — which possess remarkable "fastness" even in water — have been produced on a large scale at a purpose-built plant at Trafford Park, Manchester. Dyestuffs also continue to be developed at the organic research laboratories at Blackley.

PROVISIONAL RECOMMENDATIONS

IUPAC seeks your comments

The procedure for comment on and approval of IUPAC recommendations on nomenclature and symbols is given in the *IUPAC Handbook 1983–1985*, p. 121. This procedure is now in operation and synopses of the latest Provisional Reports are reproduced below.

It must be emphasized that copies of the full report cannot be obtained from the IUPAC Secretariat but only from your own national/regional centre. The most up-to-date list of national/regional centres appeared in *CI*, Vol. 7, No. 2, p. 13 (1985). Copies will be sent on request but on the understanding that comments will be sent to the address on the document not more than 8 months after publication in *CI*.

Terminology for polymerizations involving chiral monomers or resulting in optically active polymers

This document deals with the terminology for polymerizations of mixtures of stereoisomers and diastereoisomers that are individually optically active (chiral) and for polymerizations of prochiral monomers giving optically active polymers. It introduces the following terms:

Enantioasymmetric polymerization: a polymerization in which, starting from a mixture of enantiomers, only one enantiomer is polymerized.

Enantiosymmetric polymerization: a polymerization in which, starting from a mixture of enantiomers, the polymer formed consists of a mixture of two types of chains, each containing only units derived from one of the enantiomers.

Diastereoasymmetric polymerization: a polymerization in which, starting from a mixture of diastereoisomers, only one diastereoisomer is polymerized.

Diastereosymmetric polymerization: a polymerization in which, starting from a mixture of diastereoisomers, the polymer formed consists of a mixture of chains, each one containing only units derived from one of the diastereoisomers.

The document also discusses the polymerization of prochiral monomers and enantiogenic polymerization

Comments on these recommendations are welcome and should be sent before the end of July 1986 to Dr Norbert M. Bikales, Polymers Program, National Science Foundation, Washington, DC 20550, USA.

The nomenclature of polyanions (New Red Book: Chapter II-3)

The chemistry of polyanions is a rapidly growing field due particularly to the interest of some of these compounds. Some species are becoming very large (up to 48 tungsten atoms) and extremely complicated in structure. Many examples of substituted

species are known which lead to isomerism. Today the basic compounds are mostly known among specialists through trivial names and the existing rules for naming polyanions (*Red Book*, 1970 edition) were not elaborated enough to handle accurately all the new species described during the last fifteen years.

It appeared necessary to provide a new set of rules. The basic idea is to give a number to each central atom the environment of which is then described by letters associated to that number. The document describes various types of polyanions having what is called the Lindqvist structure, the Anderson structure, the Keggin structure, the Dawson structure, and some others derived from them.

It is hoped that the given examples will provide a procedure to name any other compound derived from any other structure.

It is clear that these compounds are very complicated and therefore have complicated names. The use of shortened names is always possible describing then only the composition but giving less information on the actual detailed structure.

Comments on these recommendations are welcome and should be sent before the end of July 1986 to Prof. Yves P. Jeannin, Laboratoire de Chimie des Metaux de Transition, Université Pierre et Marie Curie, 4 Place Jussieu, 75230 Paris cedex 05, France.

Recommended terminology for the description of "carbon as a solid": Part II

"Carbon as a solid" covers all natural and synthetic substances consisting mainly of carbon atoms such as single crystals of diamond and graphite as well as the full variety of polycrystalline industrial carbon and graphite materials. Because of the increasing interdisciplinary importance of these materials in science and technology, IUPAC has taken on the responsibility for recommendations of precise descriptions of the corresponding terms which are consistent with the scientific nomenclature. The recommendations were prepared by the IUPAC Sub-Committee SC 1 on "Characterization and Terminology of Carbon" (Commission II.3 High Temperature and Solid State Chemistry) in close cooperation with the "International Committee"

formed by 30 specialists in carbon science and industry from all over the world, representing the national "Carbon Societies", such as the "American Carbon Society", "Groupe Française sur Carbone", "British Carbon Groups", "Arbeitskreis Kohlenstoff of the German Ceramic Society", "Japanese Carbon Society", "Indian Carbon Society", and others, in contact with ASTM. All recommended descriptions have been pre-published in the International Scientific Journal "Carbon" (Pergamon Press, 1982) and were finally approved by the "International Committee" after refining by the attendees of the periodically organized International Conferences on Carbon (1980–83). As the second instalment 24 more terms have been selected and are presented in alphabetical order:

Acheson Graphite, Activated Carbon, Activated Charcoal, Artificial Graphite, Binder Coke, Cal-

cined Coke, Catalytic Graphitization, Char, Charcoal, Coal Derived Pitch Coke, Delayed Coke, Electrographite, Filler Coke, Fluid Coke, Granular Carbon, Green Coke, Highly Oriented Pyrolytic Graphite, High-Pressure Graphitization, Metallurgical Coke, Needle Coke, Particulate Carbon, Petroleum Coke, Raw Coke, Stress Graphitization.

Further descriptions for about 50 additional terms are in preparation. After completion of the cooperative work a compilation systematically arranged will be published.

Comments on these recommendations are welcome and should be sent before the end of July 1986 to Prof. E. Fitzer, Institute für Chemische Technik der Universität Karlsruhe, Laiserstrasse 12, D-7500 Karlsruhe 1, Federal Republic of Germany.

The procedure for comment on and approval of IUPAC recommendations on nomenclature and symbols

The revised procedure for publication of IUPAC recommendations on nomenclature symbols was announced in *CI*, No. 5, pp. 42–43 (1983). The procedure was also published in the *IUPAC Handbook* 1983–85, p. 121. The synopsis of the first provisional recommendations to be processed in this way appeared in *CI*, No. 3, p. 13 (1984). Since then provisional recommendations have become a regular feature of *CI*. The most recent set appears in this issue (above).

Over the last year, however, some concern has been expressed that the bureaucracy of the revised procedure might unduly delay processing of recommendations. In order to clarify the procedure for publishing these recommendations Kurt Loening, Chairman of the Interdivisional Committee on Nomenclature and Symbols (IDCNS), has prepared two flow charts depicting the mechanism. These are shown in Figs 1 and 2. They were used to illustrate a presentation by Dr Loening at The Second Infoterm

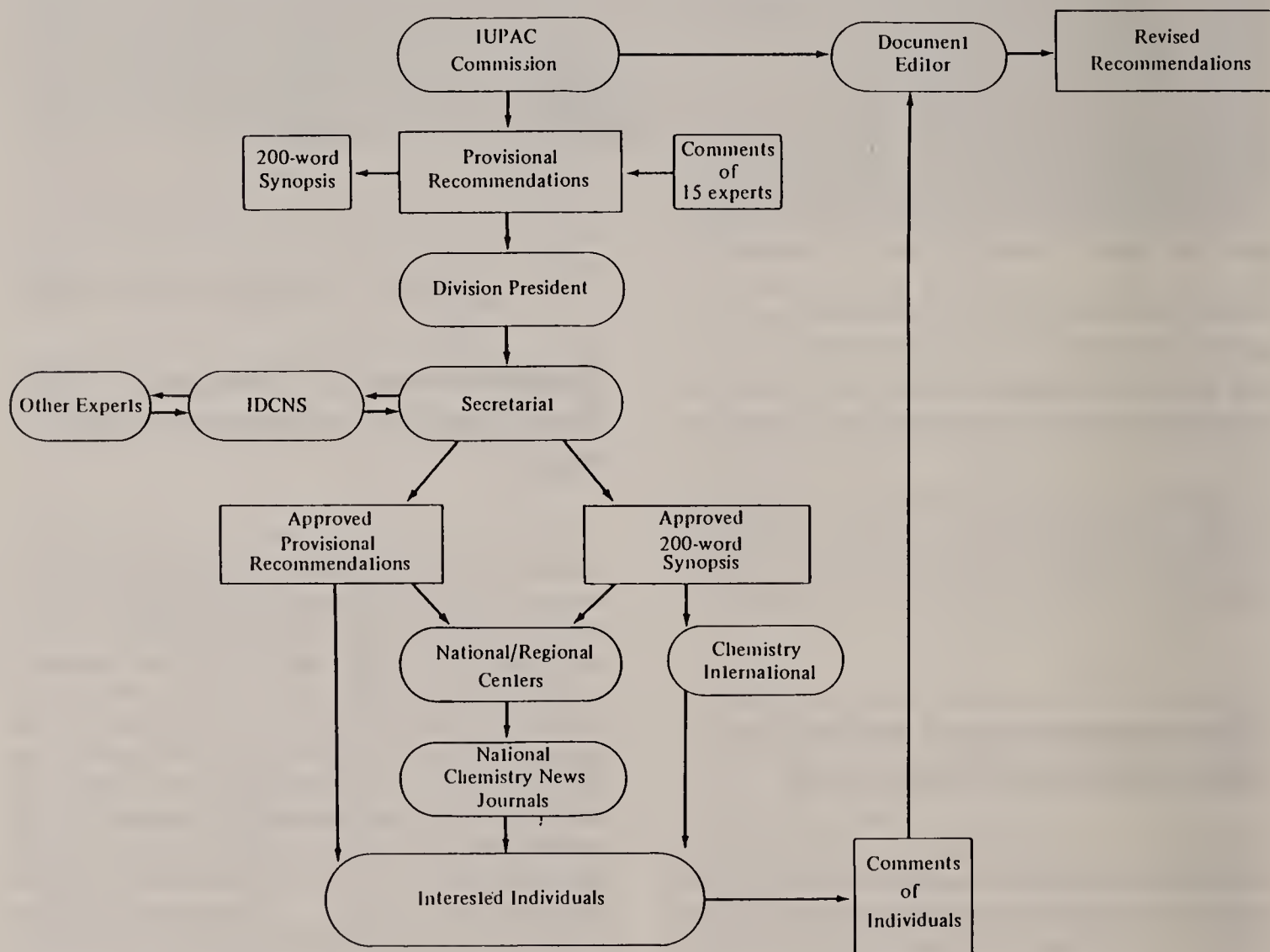


Figure 1.

Symposium entitled "Networking in Terminology: International Cooperation in Terminology Work" which was held in Vienna in April this year (see *CI*, No. 4, p. 43 (1985)).

Figure 1 shows how the provisional recommendations are generated by IUPAC Commissions. After comment from experts and approval by IUPAC a synopsis is published as "Provisional recommendations" in *CI*. Individuals may also comment on the approved provisional recommendations through their national or regional centres. The most up-to-date list of these appeared in *CI*, No. 2, p. 13 (1985). The approved provisional recommendations are then revised in the light of these comments and resubmitted to IDCNS before publication in *PAC* (see Fig. 2).

A note to Commission Chairmen and Secretaries

The publications procedure requires that the comments of experts and interested individuals on provisional recommendations are taken into consideration before the revised recommendations are finalized. Since the publications procedure came into operation I have learnt of several instances where comments submitted by referees and the general public have not been acknowledged. I would therefore request that Commission Chairmen and Secretaries responsible for publication of recommendations acknowledge any comments that are received and inform the persons who have submitted them that their comments will be carefully considered by the Commission before publication of

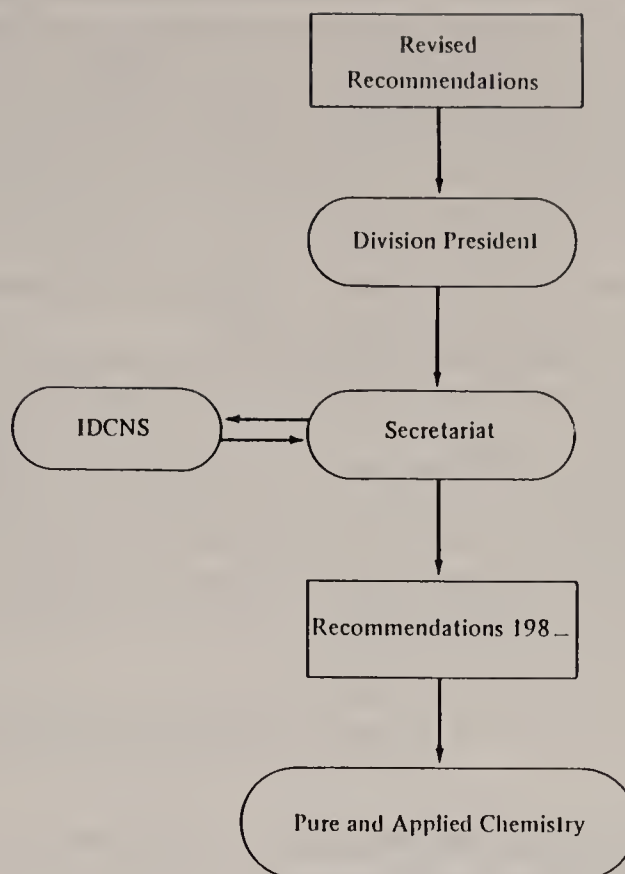


Figure 2.

the revised recommendations. Failure to acknowledge comments may adversely affect the image of the Union.

CONFERENCES

South-South and South-North Cooperation in Science

The Third World Academy of Sciences organized a major Conference on South-South and South-North Cooperation in Science, in Trieste, Italy, 5-10 July 1985. The Conference was attended by scientists from developing countries and also representatives of international organizations and national academies of advanced countries. Overall, 200 delegates from 63 countries attended the Conference. The Conference was opened by Mr Pérez de Cuéllar, Secretary General of the United Nations. The venue of the Conference was the International Centre for Theoretical Physics. This is headed by Prof. Abdus Salam (Pakistan). Prof. Salam is also President of the Third World Academy of Sciences.

The Third World Academy has a few founding Fellows consisting of distinguished scientists from developing countries who are already recognized by major academies of the world. It also has founder Associate Fellows consisting of distinguished scientists from developing countries who have settled in advanced countries. The Third World Academy has elected several new Fellows and Associate Fellows recently.

The specific objectives of the Conference were:

- to identify various science projects in which South-South and South-North cooperation is most profitable, and to examine possibilities of finding financial support for such projects;
- to strengthen cooperation among science academies and Research Councils of the South and to promote their role in the development of science in the Third World;
- to strengthen cooperation between academies of the South and academies of the North;
- to identify high-level scientific research performed by Third World scientists as a modality of South-North cooperation in the advancement of science.

In the Conference, there were lectures related to science, technology and development delivered by experts. Representatives of the foreign academies and international bodies also presented how South-North collaboration and cooperation would help development in the countries of the South. The role of international scientific societies was also discussed.

The main theme of the Conference was how to promote science in developing countries and in this direction, a number of important suggestions and plans of action were proposed in the conference by various subject groups and regional groups. Several regional groups met and decided to carve out their own plan of action for the region. For example, an Arab Academy of Science as well as an African Academy of Science will be started very soon by scientists of the respective regions.

The Third World Academy of Sciences will provide the forum for exchange of views and for promoting science in developing countries. For example, the Third World Academy will offer research grants for basic science in developing countries. It would also provide contacts for South-South and South-North collaboration. Health of Science in developing countries is of great concern to the Third World Academy.

There were a few talks during the evenings to illustrate the kind of quality research being carried

out by scientists in some of the developing countries.

As a Founding Fellow of the Third World Academy, I was happy to see the Third World Academy in action. If the enthusiasm of the participants is any indication, there is no doubt that the Third World Academy will emerge to be a great influence on the growth of science in developing countries. It may indeed be possible for the Third World Academy to initiate and catalyse action related to science and technology in the South. The Italian Government has granted three million dollars for the various activities of the Academy.

The organization of the Conference was excellent and the atmosphere of the International Centre on the shores of the Adriatic ocean was truly invigorating. Prof. Salam has provided outstanding leadership, and has made a remarkable contribution in launching the Third World Academy of Sciences and in chalking out action programmes for the Academy.

C. N. R. Rao

The Chemical Industry — Where in the World is it Going?

This is the theme of a World Chemical Congress of Marketing and Business Research sponsored by the American Chemical Society's Division of Chemical Marketing and Economics and The Chemical Marketing Research Association of the United States. The meeting will be held at Newport Beach, California, 7–10 September 1986. For further details contact Joseph L. Bevirt, Liaison Chairman, The Dow Chemical Company 2020 Willard H. Dow Center, Midland, MI 48640, USA.

Surfactants

In April 1986, the Royal Society of Chemistry will hold an International Symposium on The Industrial Applications of Surfactants, at the University of Salford, UK. A primary objective of this conference is to foster an awareness of the many industrial applications of surface active agents. Topics to be covered include the use of surfactants in the agrochemical, paint and polymer, mining, textile, pulp and paper, food processing, building, industrial hygiene and metal treatment areas. For further information contact Dr David R. Karsa, Lankro Chemicals Limited, PO Box 1, Eccles, Manchester, M30 0BH, England.

CONFERENCE CALENDAR

1986

Chemical Resources of the Ocean

24–29 March. CHEMRAWN IV: The Global Ocean — Its Chemistry and Resources. Woods Hole, Massachusetts, USA.

(CHEMRAWN IV Coordinating Office. Oceanography Program. The University of Michigan, 2455 Hayward Avenue, Ann Arbor, Michigan 48109-2143, USA.)

Biological Reference Materials

24–25 April. 2nd International Symposium on Biological Reference Materials. Neuherberg, Munich, FRG.

(Dr M. Stoeppler, Institut für Chemie der Kernforschungsanlage, Jülich GmbH, Institut 4: Angewandte Physikalische Chemie, Postfach 1913, D-5170 Jülich I, Federal Republic of Germany.)

Organic Chemistry in Technological Perspective

1–6 June. International Symposium on Organic Chemistry of Technological Processes. Jerusalem, Israel.

(Prof. D. Vofsi, The H. Levine Center for Industrial Research, Weizmann Institute of Science, Rehovot 76100, Israel.)

Ring-Opening Polymerization

22–26 June. 5th International Symposium on Ring-Opening Polymerization. Blois, France.

(Dr N. Spassky, Laboratoire de Chimie Macromoléculaire, Université Pierre et Marie Curie, Tour 44, 4 place Jussieu, F-75230 Paris Cédex 05, France.)

Synthetic Polymeric Membranes

7–10 July. 29th Microsymposium on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Crosslinked Epoxides

14–17 July. 9th Discussion Conference on Macromolecules. Prague, Czechoslovakia.
(Mrs H. Konášová, Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, 1888 Petriny, CS-162 06 Prague 616, Czechoslovakia.)

Chemical Thermodynamics

14–18 July. International Conference on Chemical Thermodynamics. Lisbon, Portugal.
(Prof. Jorge C. G. Calado, School of Chemical Engineering, Cornell University, Olin Hall, Ithaca, N.Y. 14853-5201, USA.)

Analytical Chemistry

20–26 July. SAC 86: International Conference on Analytical Chemistry. Bristol, UK.
(The Secretary, Analytical Division, Royal Society of Chemistry, Burlington House, London W1V 0BN, UK.)

Photochemistry

28 July–1 August. 11th International Symposium on Photochemistry. Lisbon, Portugal.
(Prof. F. Wilkinson, Department of Chemistry, Loughborough University of Technology, Loughborough, Leicestershire, UK.)

Organic Synthesis

10–15 August. 6th International Conference on Organic Synthesis. Moscow, USSR.
(Dr. G. V. Kondratieva, Institute of Organic Chemistry, Leninsky prospect, 47, SU-117913 Moscow B-334, USSR.)

Pesticide Chemistry

10–15 August. 6th International Pesticide Chemistry Congress. Ottawa, Canada.
(The Chemical Institute of Canada, 151 Slater Street, Suite 906, Ottawa, Ontario, Canada K1P 5H3.)

Solubility Phenomena

12–15 August. 2nd International Symposium on Solubility Phenomena. Newark, New Jersey, USA.
(Dr M. Salomon, Symposium Co-Chairman, PO Box 254, Fair Haven, New Jersey 07701, USA.)

Non-aqueous Solutions

17–21 August. 10th International Conference on Non-aqueous Solutions. Leuven, Belgium.
(Dr G. Maes, Department of Chemistry, University of Leuven, Celestijnenlaan 200F, B-3030 Heverlee, Belgium.)

Natural Products

17–22 August. 15th International Symposium on the Chemistry of Natural Products. The Hague, Netherlands.
(Dr G. J. Koomen, Secretary, 15th IUPAC International Symposium on the Chemistry of Natural Products, Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, 1018 WS Amsterdam, Netherlands.)

Physical Organic Chemistry

24–29 August. 8th IUPAC Conference on Physical Organic Chemistry. Tokyo, Japan.
(Prof. M. Ōki, Department of Chemistry, Faculty of Science, University of Tokyo, Tokyo, 113 Japan.)

Coordination Chemistry

24–29 August. 24th International Conference on Coordination Chemistry. Athens, Greece.
(Dr Ersi Vrachnou-Astra, Department of Chemistry, Nuclear Research Center 'Demokritos', 153 10 Aghia Paraskevi, Athens, Greece.)

Raman Spectroscopy

31 August–5 September. 10th International Conference on Raman Spectroscopy. Eugene, Oregon, USA.



New Jersey Institute of Technology, venue of the 2nd International Symposium on Solubility Phenomena.

(Prof. Warner L. Peticolas, Department of Chemistry, University of Oregon, Eugene, Oregon 97403-1210, USA.)

CHEMRAWN V

22–26 September. CHEMRAWN V: Current and Future Contributions of Chemistry to Health — The New Frontiers. Heidelberg, FRG.

(Dr W. Fritsche, General Secretary, Gesellschaft Deutscher Chemiker, Varrentrappstrasse 40–42, D-6000 Frankfurt/Main 90, Federal Republic of Germany).

1987

CHEMRAWN VI

17–22 May. CHEMRAWN VI. World Conference on Advanced Materials Needed for Innovations — Energy, Transportation and Communications. Tokyo, Japan.

(Dr H. Hamada, Executive Director, The Chemical Society of Japan, 1–5 Kanda-Suragadai, Chiyodaku, Tokyo, Japan.)

Macromolecules

13–16 July. 30th Symposium on Macromolecules. Polymer-Supported Organic Reagents and Catalysts. Prague, Czechoslovakia.

(Dr P. Cefelin, Scientific Secretary, P.M.M. Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Heyrovského namesti 2, CS-16206 Prague 6-Petriny, Czechoslovakia.)

IUPAC Congress

13–18 July. 31st International Congress of Pure and Applied Chemistry. Sofia, Bulgaria.

(Dr R. Vlahov, Institute of Organic Chemistry, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria.)

Coordination Chemistry

21–26 July. 25th International Conference on Coordination Chemistry. Beijing, China.

(Prof. Guang-Xian Xu, Director of Inorganic Chemistry Division, Department of Chemistry, Peking University, Beijing, China.)

Critical Reports on Applied Chemistry

Selected Developments in Catalysis

Volume 12

Edited by J.R. Jennings

1985. 174 pages, 48 illustrations. £37.00.

This volume deals in detail with a small number of topics, diverse enough to give the new reader a broad introduction to the subject of catalysis.

Technology of Gasoline

Volume 10

Edited by E.G. Hancock

1985. 150 pages, 25 illustrations. £32.50.

This broad coverage of gasoline technology is of wide appeal to all interested in petroleum for whatever reason.

Chemical Thermodynamics in Industry: Models and Computation

Volume 8

Edited by T.I. Barry

1985. 164 pages, 43 illustrations. £25.00.

Intended for project managers and research workers, this book provides insights into how thermodynamics can help in decision making, process design and materials selection.

Materials Used in Pharmaceutical Formulation

Volume 6

Edited by A.T. Florence

1984. 180 pages, 10 illustrations. £17.50.

Published for the Society of Chemical Industry by

Topics in Wastewater Treatment

Volume 1,1

Edited by J.M. Sidwick

1985. 128 pages, 28 illustrations. £29.00.

The book presents four original, critical chapters on key issues in the subject of wastewater treatment.

Chemicals from Coal: New Developments

Volume 9

Edited by K.R. Payne.

1985. 130 pages, 46 illustrations. £29.50.

The extensive UK reserves of coal ensure its long-term importance as a source of organic chemicals. This volume describes development work on two conversion processes: the pyrolysis and liquefaction of coal.

Developments in the Chemistry and Technology of Organic Dyes

Volume 7

Edited by J. Griffiths

1984. 144 pages, 18 illustrations. £25.00.

Biophysical Methods in Food Research

Volume 5

Edited by H.W.-S. Chan

1984. 212 pages, 75 illustrations. £19.50.

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Chemicals from Coal: New Developments

*Critical Reports on Applied Chemistry,
Volume 9*

Edited by K.R. Payne BSc, CChem, FRSC,
Consulting Chemist

The use of coal as a source of organic chemicals reached its peak in the U.K. shortly after the Second World War, and then declined in importance when oil became cheap and plentiful. However, since the early 1970s global events have prompted a critical examination of the future availability of fossil fuel supplies, and the general conclusion is that the extensive U.K. reserves of coal ensure its long-term importance as a source of organic chemicals, and justify the extensive development work which is currently being carried out on the various coal conversion processes. In this volume, development work on two such processes is described, namely those involving the pyrolysis and liquefaction of coal. A comprehensive study of the economics of coal conversion processes provides the introductory chapter.

1985. 130 pages, 46 illustrations.

£29.50

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The International Union of Pure and Applied Chemistry (IUPAC), formed in 1919, is a voluntary, non-governmental, non-profit association of organizations, each of which represents the chemists of a member country.

Its objectives are:

- to promote continuing co-operation among the chemists of the member countries;
- to study topics of international importance to pure and applied chemistry which need regulation, standardization, or codification;
- to co-operate with other international organizations which deal with topics of a chemical nature;
- to contribute to the advancement of pure and applied chemistry in all its aspects.

The membership of IUPAC presently comprises 44 countries, each represented by a national organization, such as an academy of science or research council.

NATIONAL ADHERING ORGANIZATIONS

Academy of Scientific Research and Technology
(**Arab Republic of Egypt**)
Asociación Química Argentina (**Argentina**)
Australian Academy of Science (**Australia**)
Verein Österreichischer Chemiker (**Austria**)
Comité National Belge de Chimie (**Belgium**)
Associação Brasileira de Química (**Brazil**)
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Israel Academy of Sciences and Humanities (**Israel**)
Consiglio Nazionale delle Ricerche (**Italy**)
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Koninklijke Nederlandse Chemische Vereniging
(**Netherlands**)
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